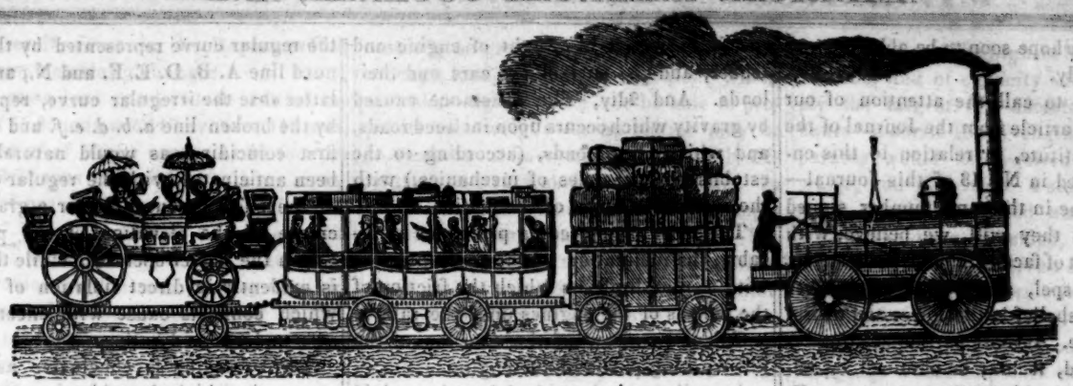

AMERICAN RAILROAD JOURNAL,
AND ADVOCATE OF INTERNAL IMPROVEMENTS

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AMERICAN RAILROAD JOURNAL.

NEW-YORK, APRIL 9, 1836.

AVERY'S ROTARY ENGINE.

This engine has become a subject of considerable interest, not only in this country but in Europe. We have been frequently inquired of by letter and otherwise, as to its ability, cost, cost of fuel and attendance, &c. &c.—yet, although entirely satisfied as to its ability and economy, until the present time we have been unable to give a definite answer to these questions. And, indeed, even now, we do not speak with that *precision* in relation to *cost* which we should like, although we are sure to put it high enough; and even a little *beyond* the mark, that those who purchase may, if at all, be favorably disappointed.

After repeating the remark of a gentleman of much experience with steam engines, viz. "that when it was in successful operation, if they would give him a good pair of *leather mittens* [*he would hold* it"—meaning that he could take hold of the shaft on which the *arm* is fixed, and with which it revolves at the rate of 3000 times a minute, and stop its motion if he had on a pair of "*leather mittens*"—we will proceed to give some particulars in relation to it, which, from personal observation, and from the statement of the intelligent superintendent, we can vouch for.

The arms of the engine are 30 inches long from the exterior of the shaft to the apertures, and the apertures are each the $\frac{1}{12}$ of a square inch—they are inclosed in a circular cast iron case—the shaft receiving the steam at one end and having a pulley for the main band on the other.

The following machines are all attached to, and operated by it, viz:

1 upright saw with 30 inch stroke, or 15 inch crank—averaging 110 strokes per minute.

1 buzz saw, 24 inch, cutting a kerf of $\frac{3}{16}$ of an inch, with 22 to 2400 revolutions per minute.

3 24 inch circular veneering saws.

1 26 " " " "

1 27 " " " " varying from 12 to 1500 revolutions per minute.

1 15 inch buz saw, with 1200 revolutions per minute, and

1 whip saw for curves, with 9 inch sweep and 250 strokes per minute.

1 grindstone.

1 blower for the furnace.

And the pump raising water 30 feet into a resorvoir for its own use.

These machines are not *always all* at work at the same time—as some of them require repairing, or filing, or they are taking off or putting on logs, but this may be said without fear of contradiction—they *can* all be driven at the same time by the engine now in use, for 10, 12, or any number of hours that the superintendent and hands can tend it—and that, too, with the evaporation of an average *not to exceed* 40 *gallons of water per hour*.

The boiler now in use was made for a piston engine, and was intended for 15 horse power.

It has been asked, and frequently, what is the power of this engine. This is a question easier asked by many, than answered—yet most practical men form an opinion for themselves, of the power required to carry this machinery—and it is, of course, in this way, estimated variously

It cannot, however, we presume, be put down at less than the following estimate viz:

	Horse Power.	
The upright saw, sawing 110 feet per hour,	5	5
" large buz saw, sawing 120 feet per hour,	5	5
" small " "	1½	1½
" veneering saws,	1 each	5
" whip saw, grindstone, pump, and blower	——	1½
		18

But to avoid over-estimates, we will put the whole at 15 horse power, to accomplish which 40 gallons of water are evaporated at an expense of fuel of *one dollar* for every ten working hours, and $1,25 cents for attendance on the engine and fire.

It should be borne in mind, that these saws are all used in sawing mahogany—except the whip-saw, which is used for sawing all kinds of timber.

In addition to the above, a turning-lathe is to be put in operation in a few days.

The question has been and may be again asked, what will the boiler and other fixtures cost, to put this engine in operation?

It may be answered, although not very satisfactorily, by saying that the boiler and fixtures for driving it will not cost more than for any other engine of equal power. On

this point, we hope soon to be able to speak more definitely.

We desire to call the attention of our readers to an article from the Journal of the Franklin Institute, in relation to this engine, published in No. 13 of this Journal—and also to one in the same number, signed "Hiero," as they will, we believe, with this statement of facts, tend at least to shake, if not to dispel, some of the prejudice against, or disbelief in the power and utility of, this engine. If more particular information is desired, it may be obtained by addressing, post paid, William Avery, or E. Lynds & Son, Syracuse, New-York, or Mr. Joseph Cuttis, the agent for this city, or the Editor of this Journal.

By the way of comparing it with other engines, we shall feel greatly obliged to any gentleman who will give us a statement of the *water and fuel used*, and labor performed, by a *piston engine of fifteen horse power!* When received, we will lay it before our readers.—[Ed. R. R. Jour.]

Thames Tunnel.—We commence, in this number, a concise description of the Thames Tunnel, with views—and shall continue it in a subsequent number—after which it will be published in book form.

For the Railroad Journal.

STRICTURES ON THE REPORTS OF THE STATE ENGINEERS.

No. III.

We again quote from the Report of John B. Jervis, Holmes Hutchinson, and Frederick C. Mills, on the comparative merits and cost of Canals and Railroads, Doc. 296, p. 33, of the last session of the N. Y. Legislature, as follows—

	Feet per mile.	Tons.
"On a level the gross load will be		75.25
On a road or section having an ascent of	10	49.53
" " " " " " "	20	37.35
" " " " " " "	30	27.24
" " " " " " "	40	20.22
" " " " " " "	50	17.04
" " " " " " "	60	13.92
" " " " " " "	70	11.31"

We demonstrated in our last No., that the absolute power of the locomotive engine as exhibited in the above table, whether upon a level or inclined road, was rated altogether too low, being from 50 to 100 per cent. short of the results obtained by experiments actually made for months previous to the time when the Report in question was rendered. We present the table a second time, for the purpose of showing that the relative results therein given for different inclinations, could not have been estimated by correct formula, and were not in accordance with the "most approved" experiments and facts, as they existed at the time the Report was written.

In determining the resistance to be encountered in the movement of a train of cars, under the circumstances as assumed in the table, two things are to be considered. 1st. The resistance arising from friction, and the want of perfect smoothness and regularity in the rails and wheels, which we will assume the same as in the Report, to wit: $\frac{1}{223}$ part of weight of engine and tender, and $\frac{1}{230}$ part of the cars and their loads. And 2dly, The resistance caused by gravity which occurs upon inclined roads, and which corresponds, (according to the established principles of mechanics,) with the size of the angle of inclination.

To render the preceding principles applicable, the inclination of the road must be within that limit on which the friction of the wheels of the engines upon the rails is sufficient to allow of the exertion of the full working power of the engine.

According to the principles above laid down, and assuming the gross load upon a level to be as above stated, to wit: 75.25 tons, the weight of the engine and tender being taken at ten tons, the following results are obtained:

Inclination of Road pr. Mile in Feet.	Gross Load in Tons taken from the above Table.	Corrected Gross Load in Tons.	Diff. Tons.	Error per Cent.
Level	75.25	75.25		
10	49.53	47.80	1.73	4
20	37.35	33.72	3.63	11
30	27.24	25.15	2.09	8
40	20.22	19.40	.82	4
50	17.04	15.26	1.78	12
60	13.92	12.14	1.78	14
70	11.31	9.71	1.60	16

Our readers will perceive that the amount of the variation or error of the results as given in the Report deviates from the truth from 4 per cent. up to as high as 16 per cent.! It is therefore evident that the results given in the Report could not have been formed by the aid of correct mechanical and mathematical principles. Indeed the results themselves exhibit this fact on their very face.

It will be obvious to most of our readers that the effect produced on the several inclinations, (increasing as the latter do by a common difference of 10 feet) must regularly diminish by some particular law. In the results given in the Report this law is evidently violated.

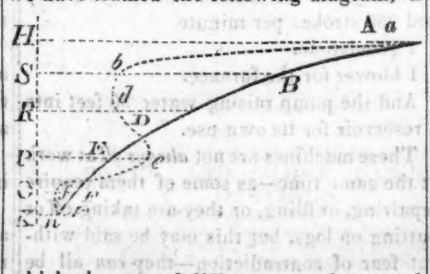
The following are the second differences:

13.54 2.07 3.09 3.84 0.06 0.51

The same differences drawn from the corrected results are as follows:

13.37 5.51 2.82 1.61 1.02 0.69

To render the discrepancy more apparent we have framed the following diagram, in



which the second differences in the second line are represented respectively by the ordinates HA, SB, RD, &c., and those in the first line by H*a*, S*b*, R*d*, &c. Connecting the extremities of the former, and we have the regular curve represented by the continued line A. B. D. E. F. and N., and in the latter case the irregular curve, represented by the broken line *a. b. d. e. f.* and *n.* The first coinciding, as would naturally have been anticipated, with the regular decrease of the effect produced under a gradual increase of the elevation of the plane on which the power operates, while the latter is evidently in direct violation of the law which connects cause with effect, in the case under consideration.

The preceding is conclusive as to the manner in which the table presented in the Report was formed. The process as declared in our last number, must have been an empirical one, as calculations made upon true principles could never have led to such discordant results.

We have dwelt longer upon this branch of the subject than its importance would perhaps seem to demand, but as the statements in the Report were evidently put forward with some pretension to science, we have felt it a duty to lay bare the foundation on which that pretension rests.

We now proceed to give a statement of the comparative force of traction of engines on the Baltimore and Ohio Road, as deduced from the experiments referred to in our last No.

Inclination of Road in Feet per Mile.	Engine as assumed in Report, with results corrected.		Arabian Engine, velocity 11 79-100 Miles per Hour.		Geo. Washington Engine, velocity 11¼ Miles per Hour.	
	Tons.	Ratio to a Level	Tons.	Ratio to a Level	Tons.	Ratio to a Level
Level	75.25		113.00		211.00	
10	47.80	63	73.08	65	139.20	66
20	33.72	44	52.62	47	102.38	48
30	25.15	33	40.16	36	79.99	38
40	19.40	25	31.79	28	64.93	31
50	15.26	20	25.78	23	54.11	25
60	12.14	16	21.24	19	45.96	22
70	9.71	13	17.71	16	39.60	19
80	7.76	10	14.87	13	34.50	16
90	6.16	8	12.55	11	30.32	14
100	4.83	6	10.61	10	26.83	13

The rates here given for the Geo. Washington and Arabian engines, for different ascents, are *below the actual performance of those engines.* This is principally owing, we presume, to the fact that the friction, instead of being $\frac{1}{230}$ of the gross load, as assumed, is probably the $\frac{1}{220}$ or $\frac{1}{200}$ part.

The second column contains the corrected results as ascertained above, for different inclinations, the gross load being the same as assumed in the Report, viz: 75.25 tons. The fourth column shows the force of traction of the Arabian, and the sixth that of the Geo. Washington engine. The Arabian was in operation, and an official statement of its performance rendered for months previous to the Report under consideration being made. We expressed, in our last No., our surprise that the improvements on the Baltimore Road were not referred to or noticed in the Report. Had they been fairly presented, the complexion

of the results given in the Report would have been materially changed.

The gross load conveyed on a level, instead of 75.25 tons, would have been 113 tons, an increase of 50 per cent. At 30 feet per mile, 39.72 tons instead 25.15, being an increase of nearly 60 per cent. At 70 feet per mile, 17.70 tons instead of 9.70 tons, an increase of nearly 80 per cent. It is true that the Arabian engine was heavier than the one assumed in the Report, being 7½ tons, the latter being 6½ tons, but it had *one and one third* times the power.

A difference so great, it will be at once perceived, would have materially affected the cost of transportation upon Railroads; as exhibited in the Report, the reduction in the expense being greater in proportion upon the higher or steeper grades.

In the sixth column above, are the results deduced from the performance of the Geo. Washington engine. This engine was constructed subsequent to the rendering of the Report. The statements in relation to it are introduced here with a view of exhibiting the present state of improvements in the application of locomotive steam power upon Railways. It is presented likewise for the purpose of exhibiting to our readers the character and extent of the improvements which have been made upon the Baltimore Road, within the last three years, and impressing their minds with the degree of credibility and importance to be attached to the performances of the Arabian engine, and also for another purpose, which will appear hereafter. The power of the Geo. Washington was *two and a half times* that of the engine assumed in the Report, while its weight was only one third greater.

We will conclude this number by commenting upon the following, pages 33 and 34 of the Report:

"There are engines of a larger size than the one assumed, *but it is the most approved at this time* in reference to the weight of engine and the weight of the working wheels. This, however, is unimportant, as the comparison will not be at all affected by varying the power of the engine. The ratio between a level and the ascents will remain the same notwithstanding."

The assertion here unequivocally made, that the ratio of the effect produced between a level and the ascents is not affected by the power of the engine, is incorrect both in theory and practice.

A glance at the statements above given, in relation to the powers of the different engines, shows that the gross load which the Geo. Washington engine is capable of conveying up an inclination of 70 feet per mile, has a ratio compared with a level *one and a half times* that of the engine assumed in the Report, and for an inclination of 100 feet per mile, *double* that given in the Report. It is obvious that as the power of the engine is increased, the gross load conveyed will be greater compared with its weight, and that the effect produced on any given inclination compared with a level must necessarily be greater. Such an engine will convey a load up an inclination along which a weaker engine would not be able to propel its own weight—or an engine may be so weak as to have its power entirely exhausted on a very moderate inclination. In either case the absurdity of the principle asserted in the Report is apparent. We are not surprised at this; it only comprises what we have already had occasion to infer, that the mechanical principles of the operation of engines on inclined roads could not have been thoroughly understood by the writers of the Report.

It is almost needless to add, that the absolute and relative cost of transportation per ton per mile, on different inclinations, as exhibited in the Report, is necessarily erroneous. The manner, likewise, in which the cost of transportation on different inclinations is represented, is calculated to mislead those who are not particularly conversant with the subject, since no allowance appears to be made, or intimation given, of the very great saving in power in descending, which invariably occurs in a reciprocal trade.

We shall resume this subject in our next No., and examine particularly into the principle adopted in the Report of reducing inclined roads to equivalent level ones.

OWEGO.

ON SUPPLYING THE CITY OF NEW-YORK WITH WATER.

To the Editor of the Railroad Journal:

Sir,—The supply of water now being brought into New-York from the Croton river, will be very ample and of the best quality, and it will doubtless, by admitting of a more copious supply in cases of fire, contribute as well to the further security of property as to the general improvement of the health of the city. I have always, however, inclined to think, with what propriety remains to be seen, that that portion of the water necessary to the supply of the Fire Department, considering the great amount of property annually consumed in this way, should be seperate from that used for family purposes; in fact, that for the extinction of fires there should be a distinct supply and mode of supply, distinctly governed and independent of the contingent accidents which sometimes affect the other.

In view of this, the excellent waters of the Croton would be reserved simply for the personal use of the inhabitants—a system of fire police would be established containing within itself all essential requisites, and capable of progressing in improvement independent of the control or opinions of other departments. This system, subject as a whole to the city, had better consist of various independent divisions, each connected with the North and East river. My ideas in the present immature view of the subject, would be to attach a reservoir to each division, situated on the river, and having its tank sufficiently raised to command the top of the highest building in that division, and of capacity sufficient to supply the largest fire ascertained for two hours—a small steam engine or other apparatus would be required to raise the water, and if it were a steam engine, it could always be heated and in operation within the time specified, renewing the supply. From this reservoir four inch pipes would branch into every street of the division, and at the corners of all the streets, and within frequent distances on these streets fire plugs would be placed raised above the pavement, occupying but little space and having quadration cocks, within a proper case, with a common key, one of which would be in the hands of the foreman of every hose company, and one also lying with some respectable house in the neighborhood. No part of this water would be permitted to be used for any other purpose; small pipes of 1½ or 2 inchs diameter would be carried into such properties as desired them, running up the inside of the front wall to the top of the house, and having a communication with each story, always open, and charged when necessary by means of the stop-cock on the street. These and various other arrangements easily suggested could very commodiously and profitably be introduced.

A very important item of the city water is at present used to extinguish fires—this water might as well be salt or river water as any other. My opinion is, that the Fire Department, to be effective, should have the entire control of the water appropriated to its use: at present the individual companies are beautifully arranged and the engines ably manned, yet in such a city as this, there is wanting a more complete system of defence against this destroying element than at present obtains. Compared with the amount of property annually consumed, the cost of such an experiment would be but a trifling tax.

Respectfully, S. D.

Boston, Feb. 18, 1836.

[It has been objected to the use of salt water—that the pipe stop-cock, and all cocks of metal liable to its contact are injured, and in some instances rendered useless. The great injury to furniture, &c., in houses deluged with water, (as is often the case,) to prevent the spread of a conflagration. However, salt water is better than no water.]

PROFESSOR BARLOW'S REPORT ON RAILWAYS.—In the London Mechanics' Magazine for February, which has just come to hand, we find some extracts from the Report of Professor BARLOW, who was appointed by the Directors of the London and Birmingham Railway Company to visit the Liverpool and Manchester Road for the purpose of ascertaining the best form of rail, chair, &c. &c.

The report, judging from the extracts, promises much useful information on the

subject, and we shall endeavor to obtain it and publish it entire.

Since the publication of his first report (of which we gave a full abstract in No. 612), Mr. Barlow has been again engaged by the Directors of the London and Birmingham Railway, "to visit the Liverpool and Manchester Railway, to view that line, and advise this Board as to the weight of rails, the description of chairs and fastenings, the distance of the supports, and the size of the blocks that he would advise the Directors to adopt; and to accompany such advice with any observations generally on the subject."

Accordingly, accompanied by two of the London Directors, and met at Liverpool by two of that town, he entered on his task, furnished by the liberality of the Liverpool and Manchester Railway Company with every necessary facility and accommodation.

The following extract, besides showing the necessity of the investigation, presents a vivid and faithful picture of the uncertainties and contradictions into which practical men fall when they despise the help of theorists, while it gives, and on proper grounds, the weight unquestionably due to the opinions formed by these same practical men from constant observation:

"We met as appointed, at the Liverpool station of the Liverpool and Manchester line, and employed the first day in examining the state of the rails, chairs, and blocks, modes of fixing, and other particulars. In the course of this examination, I took the opportunity of inquiring on the spot the opinion of the resident engineers, contractors for repairs, workmen, and others, relative to these several points; but I was much disappointed to find those opinions, in most instances, discordant, and in many directly contradictory; a circumstance the more remarkable, as one would have thought that five years' incessant practice would have been sufficient to eradicate many early erroneous ideas.

"I am not myself a practical man, but from my situation and pursuits I have been for nearly thirty years in almost constant intercourse with two of the largest and most varied mechanical establishments in the kingdom, and have, during that time, witnessed or superintended a vast number of experiments and trials on various mechanical subjects, many of which I have afterwards been enabled to examine in the works at large; I am therefore, to a certain extent, acquainted with what theory gives, and what practice requires, and the limits it prescribes; so I am also with the views and arguments of practical men, who I know sometimes, like other persons, in their anxiety to avoid one evil lose sight of other collateral evils, which their remedy increases or creates; but I must say that I never saw this so strongly marked as on the present occasion, nor such a diversity of conflicting opinions on what appears so simple and plain a case. This is a circumstance much to be regretted, not only as regards the doubts which it naturally throws upon the mind of proprietors, embarking large amounts of capital in the undertaking, but also in respect to practical men themselves, whose judgment must suffer depreciation by such discordance. Opinions derived from long experience are exceedingly valuable, and outweigh all others, while they are consistent with facts and with each other; but they are worse than useless when they lead, as in this instance, to directly opposite conclusions.

"In making these remarks, I beg to be understood as intending no disrespect to the opinions of practical men generally, but simply to show that it was impossible, in this case, for me to be guided by them, and thereby to justify the plan I soon determined to adopt; viz. to avoid, as far as possible, argument founded on mere hypothesis, and to substitute for the latter, facts drawn from actual experiments, which should be made publicly, registered generally, and witnessed by any one interested in the decision; and moreover, as I intended to rest my report entirely on these data, I resolved to offer no opinion, till I had time to analyze and compare my results. I am not certain that this plan of proceeding was quite what the deputation most approved, but I feel convinced that it was the only way in which justice could be done to the inquiry, and confidence obtained for the decision."

The dimensions of a railway-bar to support any given *quiescent* load had become pretty well known, but practical men doubted and differed as to what was required by an engine and train *in motion*, whether more or less, and how much. Knowing that the results of theory, when opposed to their previous opinions, obtain little confidence from practical men, and would, therefore, be slighted by part at least of those for whose guidance the inquiry was undertaken, the Professor wisely resolved to found his Report on experiments alone; and these are happily such as may be repeated at any time, and at small expense, till the results from them are established beyond dispute. A horizontal lever, of which the arms were as 10 to 1, was mounted between centres on a plank; its short end was placed in contact with the under side of the rail, and the other showed the deflection ten times magnified. The effects produced by the passing engines and trains were minutely observed with this *deflectometer*; and several instruments were provided, and used at once, so as to show conveniently the effects produced on different parts of the bar and its supports, by the passing of the same load. Though some objections might be made to the manner in which it was used, and, consequently, to the arguments for rendering its indications comparable with those of former experiments, it is certain that it has already furnished important data, and that it will become one of the most indispensable instruments to the railway engineer. Its first trial produced the following lesson for railway managers, which surely will not be lost upon them:—

"Our first experiments were only tentative, with a view to try the instrument, but even in these much was very distinctly shown; when, for example, a train passed over, we could see clearly the operation of each wheel upon the rail, which, where these were well laid, and the joints and blocks secure, were only of a certain amount; but when the rails were unlevel, or other irregularities occurred, some lurch would take place, towards the middle or end of the train, which would strike the rail with sufficient force to throw up the index to nearly double its previous amount, indicating, of course, that it had, in the case in question, sustained a deflection nearly double what it would have done with the same weight in a quiescent state."

Numerous and varied experiments with this instrument, while they indicate a small increase of deflection with increase of velocity, seem also to have ascertained that it is too small to need much addition to the strength of the rails; for on comparing these observations with those made at Woolwich with quiescent weights, it may be doubted whether, when allowance is made for the manner in which the deflectometer was used, any real excess of deflection was occasioned by the passing load. This, however, was not the case with the joint lengths, where the deflection was 40 per cent. additional; it is not suggested how this is to be prevented, but it is attributed partly to the looseness of the chair and block.

It seemed desirable to know, whether the deflection produced by *lateral* pressure on the outward rail in curves, required an addition to the strength of the rail in that direction; for this purpose a deflectometer was constructed of a somewhat different shape. The result, however, was, that rails sufficient for their work in other respects, would not fail under this strain, so that the subject needed no further attention.

The deflectometer rendered very apparent the importance of placing the blocks in every case opposite to each other. Until this and other precautions are taken, the constructors of railways must be content to use rails very much heavier than the work of the road actually requires:—

"In consequence of the imperfection of these parts (the blocks, &c.), a strain is occasionally thrown on the rail which produces a deflection about double that which belongs to the load in question. This effect was frequently and obviously exhibited in the experiments with the trains. In many cases, the deflectometer showed only the common amount of deflection when the engine (by far the heaviest load) passed over; whereas, perhaps in the middle, or at the end of the train, a wagon would lurch over from some irregularities, and throw up the index to double its former amount. This effect was very particularly noticed by the deputation, Directors, Proprietors, and other parties present. It follows, therefore, that till greater perfection can be obtained in railways, a strength of bar more than double that due to the mean strain must be provided. In my former report, I have allowed 50 per cent. beyond the double, as a surplus; but from these experiments, it appears this allowance is in excess, and that from 10 to 20 per cent. beyond the double will be sufficient; that is, for a 12-ton engine, as the weight is at present distributed, a strength of 7 tons would be an ample provision, and with greater accuracy of construction, such as the care now taken may

be expected to ensure, a less strength would be sufficient; or rather, allowing the same strength, an engine of 14 or 16 tons might be passed over with the greatest confidence.

"By referring to the observed results in the Appendix, it will be seen, that one rail is sometimes depressed by one wheel a quarter of an inch, while the other wheel is perhaps on a block; and immediately after the high wheel is depressed, and the lower wheel raised, giving thus a rocking motion to the carriages, the effect of which was rendered remarkably obvious by the little instrument employed. No doubt much of this is due to a want of parallelism in the bearing blocks; and therefore, as one step towards correction, I would recommend it to be made a special instruction, *that the blocks shall in every case be placed immediately opposite to each other*, which, in parallel rails, may always be effected without expense or inconvenience. Other corrections, however, are necessary, which will be noticed in their proper places."

Another branch of the subject is the length of bearing, and the consequent inquiries as to the sectional dimensions of the rail and stability of the blocks and chairs. Adopting the parallel rail, and rejecting the double-headed one, Professor Barlow determines from experience that the head of the rail ought not to have a less sectional area than 2¼ inches, that is, it should not weigh less than 22½ lbs. per yard, and that the entire depth must not exceed 5 inches. Commencing with these assumptions, he gives plans, computations, and tables for rails with bearings of the lengths of 3 feet, 3 feet 9 inches, 4, 5, and 6 feet, the sections being so arranged as to give the maximum strength.

In discussing the best sectional form of rail, Mr. Barlow makes an observation well worthy of remark:—

"In the sections given in a preceding page for rails at different lengths of bearings, it will be seen that I have confined the breadth of the lower web to 1½, or, at most, to 1⅔, inches, and this has been done, although I am well aware that, to extend the breadth of the lower web, and to reduce its depth, would theoretically give the strongest rail; in fact that the double T is, on paper, a stronger rail than the deep and less broad flanched rail, but I am quite convinced it is not so in practice. The lower web comes no other way into use than as it is brought into a state of tension by the action of the centre rib; and although the fibres of the lower web lying immediately below the centre rib are brought into action by it, and that these fibres excite a similar action laterally in those immediately contiguous to them, and these again to the next, and so on, yet in a ductile metal, like malleable iron, this lateral effect is soon lost; so that the extreme fibres of the extended lower flanch become inefficient.

"To convince Mr. Locke and some other gentlemen of the weakness of the double T form, I had one of the rails taken up, and ½ an inch cut away on each side from the lower flanch, reducing its breadth at the point of greatest strain, that is, in the middle of the bar, to 1½ instead of 2½ inches. It was then put into the press, and the trains brought on as usual, under the superintendence of Mr. Edward Woods and Mr. John Gray; Mr. Locke himself being obliged to leave just at the time the experiment was in progress.

"Mr. Rathbone, Mr. Edward Cropper, and myself, were also present, and the result was, that the bar thus mutilated showed greater strength than the mean strength which Mr. Locke found to belong to it when whole. Now, although I am ready to grant that the bar was actually weakened, and that this apparent anomaly is attributable to the imperfection of the press, yet, on the other hand, it must be admitted that it could, with such a result, have lost but little of its strength, and that the iron thus abstracted, viz. nearly ⅛ of the whole section, if judiciously introduced elsewhere, would undoubtedly give a much stronger rail."

While we fully admit the importance of these remarks, we imagine they will require further illustration before they obtain general assent. What is the longitudinal form assumed by the extreme lateral fibres supposed to be so nearly ineffectual? If it be the same as that of their neighbor fibres toward the centre, it has required force to extend them—if it be nearer a straight line, they have hindered to some amount the extension of their fellows. Mr. Barlow does not hazard opinions lightly, and will probably, on some future occasion, give further reasons for the conclusion at which he has arrived.

In testing the stability of the blocks, the deflectometer again did good service. Though no great exactness was attained, it appeared that blocks, five feet asunder, sunk as little under a passing load as those but three feet apart. Considerable difference of opinion seems to exist, as to the economy and propriety on other grounds, of the use of more or fewer blocks. The arguments on both sides are given; some of which seem to show that the Professor's help was by no means superfluous. He gives his own opinion in these words:—

"The conclusion to which I am brought, as to the relative expense of maintenance per block in five feet and three feet bearings, or, more generally, in long and short bearings, after well weighing all these points, is, first, that in embankments, and where there is a soft sub-soil, the expense would be greater at first with the long bearings than with the short, but that it would ultimately become the same, although certainly never less; and, secondly, that on rocky, or very solid bottoms, the expense would be very nearly the same from first to last."

It can scarcely be doubted, that, while the earthern surface on which the block rests is new, it will be a little compressed permanently by every blow, and the number of blows being as the distance between block and block, it will be sooner compressed under long than short bearings; but, as soon as it has become so hard as to return to its shape after the greatest blows to which it is liable, it is of little importance how often it is struck; that is, whether the bearings be long or short.

The form of chair he prefers is one which would admit a plain single T rail; but, as the rail he decidedly recommends has a bottom flanch, it is proposed, that, where the blocks fall, a protuberance shall be left on the middle rib, so as to fill up its thickness to a level with the perpendicular face of the bottom flanch. A rail is thus obtained which admits the use of a plain chair; but the adaptation of particular spots to the chair seems to bring on the same difficulty with respect to the placing of the blocks opposite to each other, as was found in the case of the fish-bellied rail. It seems possible to avoid it in either case by making the bearing places half an inch longer than the width of the chair. The reason given by some for preferring the fish-bellied rail, "that its weak neck allows it to follow a sinking chair," is certainly a curious specimen of engineering sagacity. The further observations on the best form of chair deserve careful attention.

The section on "the formation of the joints" opens very curiously:—

"On carefully examining the joints of the rails on the Liverpool and Manchester line, I am disposed to estimate that about one in six of the plain butt joints are as perfect as can well be desired, and that another one in six are as bad as bad workmanship and negligence can make them; the remaining two thirds varying in character between these two extremes."

Has this celebrated road produced its splendid effects, while one half of its power has been wasted, and its cost of repair doubled by bad "workmanship and negligence?" What may not be hoped for when searching inquiries like the present shall have brought up railway furniture even to the present standard of decent workmanship?

After urging the necessity and attainableness of much greater accuracy, and stating that government work is much better done, the report proceeds—

"In the smaller shells, which are still considerably larger than the opening in a railway chair, and unquestionably much more difficult to cast, not more than a deviation of $\frac{1}{16}$th of an inch is allowed, and I can see no reason why the railway chairs and the end of the rails, should not be submitted to at least as close a gauge. To enforce this accuracy, may perhaps incur some present charge, but do not the wear and tear of the rails and engines incur a much larger constant expense of maintenance? I am sure it is unnecessary for me to urge this point upon those proprietors who witnessed, during the experiments, the concussion on the rail exhibited by the deflectomer, which, of course, produced a light concussion on the engine and carriages. The whole of these were, doubtless, due to irregularities, of which the want of parallelism of the blocks and bad joints were the principal. Some persons present attributed them in part to flat places in the wheel; but if there are flat places in the circumference of the wheel, to what are these attributable but to bad joints? To be convinced of this we have only to consider what must be the effect of a blow on a wheel supporting a load of 3 tons, and moving

with a velocity of 30 or 32 miles per hour, when such a body meets the end of a rail rising $\frac{1}{4}$, or, perhaps, nearly $\frac{1}{2}$ of an inch above another; or when the joints are so open as to allow the wheel to fall from one upon the other, with all the impetus due to such velocity.

"In order to arrive at some estimate of this effect, a bad or open joint was selected, the deflectometer applied to the block, and the shock measured by the instrument. The rail was then taken up and relaid, so as to make the joint as close as usual, leaving the opening at the other end, and the effect was again taken, when it was found that the bad joint increased the force of concussion full 50 per cent.; that is, the engine had to sustain a shock from this circumstance one-half at least greater than was due to a very common joint, and probably double what it would have had to sustain at a good one."

Thus we may add, that the same care which is required by the "scarcely-perceptible" but important curve in the bottom of Mr. Locke's chairs (p. 55) would certainly produce much better articles than those described as in use on the Liverpool and Manchester line.

The following is the summary which the Professor gives of his Report:

"1st. I am of opinion, that as far as is consistent with the amount of the first outlay, it is desirable to increase the weight or section of the rails, and to decrease proportionally the number of bearing blocks.

"2d. That in cuttings and other places furnishing a good firm bearing, the present size of blocks is sufficient; viz. allowing for the intermediate blocks four feet, and for joint blocks five feet, while the bearing length does not exceed five feet; but that on embankments they will probably require to be proportionally increased in size. But I recommend this to be put to the test of actual experiment.

"3d. I am of opinion that the cost of maintenance will, in the former case, after a short time, be in proportion to the reduced number of blocks, but certainly not less.

"4th. I consider the double and equal flanched rail to be inferior, in strength and convenience of fixing, to that which is described and modified to suit different distances, in a preceding page.

"5th. I consider Mr. Sinclair's proposition for rendering the rail plane at its points of bearing, to be in every respect recommendable.

"6th. I am of opinion the form of chair, and method of fixing the rail in the chair, proposed by Mr. Stephenson, is as simple and efficient (adopting the plan of rolling of Mr. Sinclair) as can be desired.

"7th. Yielding, as I am always ready to do, to practical opinions, when they are found pretty generally to agree, I am disposed to think the present mode of fixing the chairs to the blocks, with a wooden plug and iron pin, is, from its simplicity and convenience, the most recommendable.

"Lastly. I am strongly convinced that no change or modification of form will produce any essential improvement, till greater uniformity be enforced in the figure and dimensions of the rails and chairs, and greater attention paid to the parallelism of the blocks, and to a proper adjustment of the distances of the ends of the rails from each other to allow for expansion and contraction."

Some important theoretical investigations follow the Report, which we cannot notice at present, further than to extract two important conclusions.

It is found, "that the sum of all the variable resistances to a load by the deflection of the bar over which it passes, is exactly half the resistance the load would experience in ascending a plane of the same half length, and whose height is equal to the central deflection of the same bar."

From the table-page 88, it seems that the increase of power required by the deflections of the bars, is nearly proportionate to the distance of the blocks; a fact which is certainly to be taken into account when determining the length of bearing.

The appendix details many experiments not given in the body of the Report.

The whole forms a very valuable contribution to our knowledge on some of the most important subjects connected with the construction and management of railways. We cannot but hope, that the same profound mathematician and veteran experimentalist will be again engaged, in illustrating the theory and correcting the practice of this most influential of recent inventions.

RAILWAY TUNNELS.

(From Mr Gibb's Report upon the several proposed Lines for a Brighton Railway.)

An objection has been made generally to all tunnels—namely, that the air contained in them will be so contaminated by the noxious gas produced by the locomotive engines in passing through them, as to render it unfit for respiration. Whether this objection has ever been advanced, or at all supported, by any scientific man possessing sufficient chemical knowledge to enable him to judge correctly on the subject, is doubtful. The probability, however, is, that the fear of any injurious effects from foul air has originated in those who have witnessed the effects produced by steam engines in passing through the small tunnels on some of our canals; and if they have for a moment imagined that any similarity will be found in the effects in the two cases, their fears are quite justifiable. The tunnels on canals are commonly constructed of such limited dimensions, that it would be highly dangerous to attempt the same application of steam power as will be necessary on a railway; for instance, in the tunnel constructed by Mr. Telford, on the Hare Castle Canal, the area above the water in the canal is only about one hundred feet; and even the Thames and Medway in transverse dimensions, perhaps the largest canal tunnel in England, has only an area of four hundred and fifty feet; while the smallest tunnel contemplated on the Brighton Railway, will have an area of at least six hundred feet.

In order to explain to what extent the air in a tunnel is contaminated by a locomotive engine passing through it, let us suppose a tunnel one mile in length to be traversed by a locomotive engine, and its train of a gross weight of one hundred tons. The experience of the Liverpool and Manchester Railway has shown that the average consumption of coke is considerably less than half a pound per ton for each mile it is carried on a railway; but taking the consumption at half a pound, the whole weight of one hundred tons will require the consumption of 50 lbs. of coke. It may be calculated that every 10 lbs. of coke will evaporate a cubic foot of water; so that the whole 50 lbs. will convert into steam 5 cubic feet of water in the distance of 1 mile. Now to convert into steam 1 cubic foot of water, requires 1,950, or say 2,000 cubic feet of air, then 5 feet of water will of course require 10,000 feet; and this will be the whole amount of contaminated air in one mile in length of tunnel. To determine the proportion of such an amount of foul air, and the whole air contained in the tunnel, we may take for example a moderate sized tunnel 30 feet high, and having an area of 800 feet. One mile in length of such a tunnel will contain 4,224,000 cubic feet; hence the contaminated air will bear to the whole quantity in the tunnel the ratio of 10,000 to 4,224,000; or it will be as 1 to 422. It will scarcely after this appear that any valid objection to tunnels, to assert that an injurious effect must result from the contaminated air, when we find that the quantity of this description of air, produced by the passing of the whole train, will be no more than $\frac{1}{422}$ part of the whole quantity in the tunnel.

Let us then venture to hope, that any prejudices which may now exist against the construction of tunnels upon railways will be dispelled, when we find that no injurious consequences will ever result from the foul air, or any other of the numerous evils which have been so forcibly dwelt upon by those who affect to perceive the most unhappy consequences from their adoption.—[London Mechanics' Magazine.]

DEPTH OF MINES.

	Feet.
Kits puhl copper mine in the Tyrol mountains,	2764
Sampson mine at Andreasberg, in the Hartz,	2230
Valencia mine, (silver,) Guanaxuato, Mexico,	2170
Pearce's shaft, (copper,) consolidated mines, Cornwall,	1650
Monkwearmouth colliery, Durham,	1600
Wheal Abraham mine, Cornwall,	1410
Eiton mine, Staffordshire,	1380

The deep mines in the Tyrol, Hartz and Andes, above described, are all in high situations—the bottom of the Mexican mine is six thousand feet higher than the top of the Cornwall shaft. The deepest perforation beneath the level of the sea, and consequently the nearest approach to the earth's centre, has been made at the Monkwearmouth colliery, which is fifteen hundred and thirteen feet below the surface of the German ocean. Pearce's shaft (thirteen hundred and thirty-eight feet below the level of the sea,) was, until lately, the deepest in the world.—[Geology in 1835, (Mining Review.)]

Fig. 1.

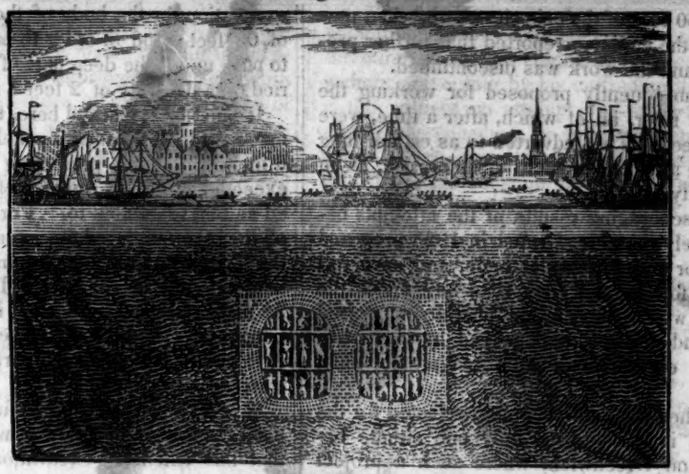
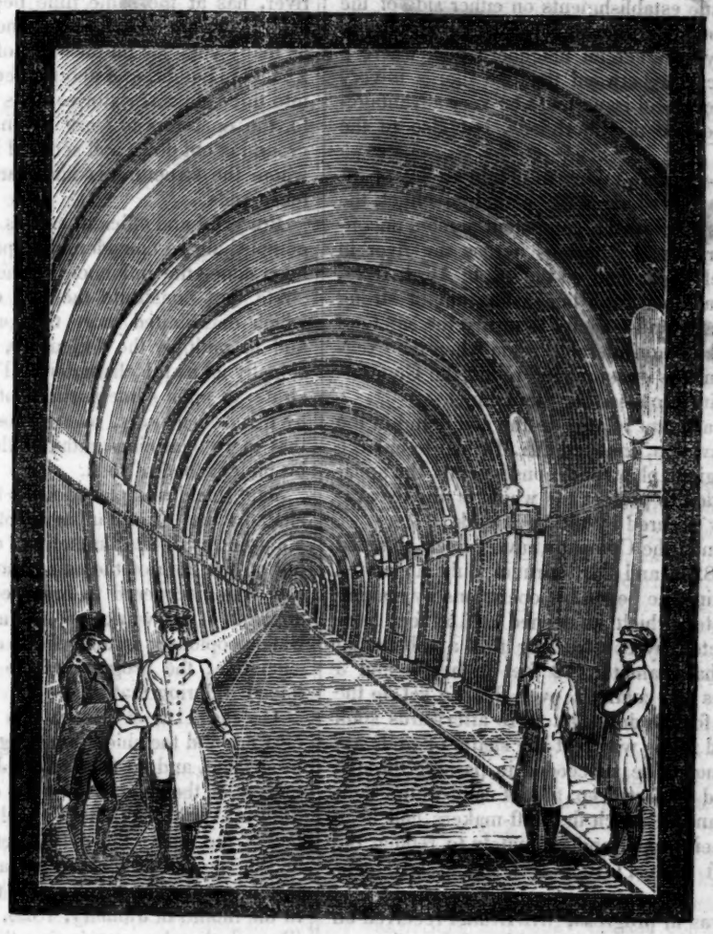


Fig. 2.



INTRODUCTION TO A VIEW OF THE WORKS FOR THE TUNNEL UNDER THE THAMES FROM ROTHERHITHE TO WAPPING.

INTRODUCTION.

Fig. 1 is a view of Wapping, with the churches of Shadwell and St. George's in the East at a distance, and a transverse section of the Tunnel, with a view of the workmen in the different cells of the shield.

Fig. 2 is a view of the western archway of the Tunnel, lighted by gas, as it now appears.

THE constant demand of information concerning the unprecedented undertaking of a Tunnel or road-way under a navigable and tide river, must serve as an excuse for the few details which are here submitted.

A very superficial knowledge of the immense mercantile concerns carried on in the neighborhood of the river Thames below London Bridge, will instantly show the great utility, and the consequent importance, of an easy conveyance by land from shore to shore at that part of the river; and it appears that the only effective resource which could be contemplated as of permanent utility, is that of a Tunnel under the bed of the river, of sufficient capacity, however, to form a constant and uninterrupted public highway.

The project of a Tunnel under the river at Gravesend was put forward in 1799, but the scheme was soon abandoned; this was followed by an attempt to form a Tunnel from Rotherhithe to Limehouse in 1804, under the authority of an act of Parliament, at which time a shaft of 11 feet in diameter was sunk to the depth of 42 feet, and from difficulties then encountered it was for a time suspended, and afterwards continued at a reduced diameter of 8 feet, to the depth of 76 feet, at which depth a small driftway was carried therefrom under the river to the extent of

928 feet, and to within 150 feet of the opposite shore, when new difficulties having arisen, the engineer reported that further progress was impracticable, and the work was discontinued.

Various plans were subsequently proposed for working the Tunnel in the bed of the river, all of which, after a time, were abandoned. These proceedings are adverted to as establishing the fact of the importance attached to such an enterprise, as an object of great public utility.

Notwithstanding the discouraging results of the attempts before mentioned, immediately that Mr. Brunel in 1823 proposed and exhibited his plan for constructing at once, and on a full scale, a double arcade, forming an easy road-way under the Thames, it was not only well received, but liberally supported by gentlemen of rank and science, undismayed by the extraordinary risks which an enterprise of such magnitude must present.

The spot between Rotherhithe and Wapping, selected for the intended communication, is perhaps the only one situate between London Bridge and Greenwich, where such a project could be attempted without interfering essentially with some of the great public mercantile establishments on either side of the river; the situation is about two miles below London Bridge, in very populous and highly commercial neighborhoods, where a facility of land communication between the two shores is very desirable, and where a successful issue must be very advantageous, not only to the immediate neighborhoods, but also to the adjacent counties.

While the necessary steps were taking to obtain an act of incorporation, and raise money to carry the plan into effect, the Committee of Subscribers employed a competent person, unconnected with the Engineer, to take borings across the river in that part, in three parallel lines; and on the 4th of April, 1824, he reported, that there was upon each line a stratum of strong blue clay of sufficient density and tenacity to insure the safety of the intended Tunnel, and of considerable value when the excavation commenced; upon this encouraging report the Committee approved of the locality proposed for the Tunnel.

This very satisfactory account relative to the soil found in the line of the intended excavation, induced Mr. Brunel to enlarge the dimensions of his original plan, and consequently the apparatus by which he intended to protect the whole of the excavation, until it was perfectly secured by the brickwork.

The act of incorporation of the Company having been obtained on the 24th of June, 1824, and Mr. Brunel duly appointed Engineer to the undertaking, he began his operations by making a shaft of feet in diameter, which he opened at 150 feet from the river. This he effected by constructing first a substantial tower of brickwork of that diameter, 42 feet in height and 3 feet in thickness, besides the coating; over this he set up the steam engine necessary for the drainage. He afterwards sunk the whole into the ground in the way that the shafts of wells are usually sunk. By this means he succeeded in passing through a bed of gravel and sand 26 feet deep, full of land-water, constituting in fact a quicksand in which the drift-makers had been compelled to suspend their work, and ultimately to reduce the dimensions of their shaft from 11 to 8 feet, as already mentioned.

While this operation was in progress, Mr. Brunel received an intimation from eminent geologists, warning him of the existence of a bed of sand lying at a greater depth, and advising him to keep as near as possible to the bottom of the river. This information corresponded with the account given by the drift-makers respecting the existence of a quicksand, and its depths beneath the level of high water.

The 50-feet shaft having been completed to the depth of 65 feet, a smaller shaft, 25 feet in diameter, destined to be a well or reservoir for the pumps, was afterwards sunk. But on approaching the depth of 80 feet, the ground gave way suddenly under this latter structure, which sunk several feet at once, the sand and water blowing up at the same time. Thus was the previous intelligence confirmed of the existence and the nature of the bed of sand in question, by which information the Engineer of the Thames Tunnel has been guided in the line that he has followed for his structure.

The shaft and reservoir having been completed, the horizontal excavation for the body of the Tunnel was opened at the depth of 63 feet: and in order to have sufficient thickness of ground to pass under the deep part of the river, the excavation was carried on a declivity of 2 feet 3 inches per hundred feet.

It must be remarked here, that the excavation which has been made for the Thames Tunnel is 38 feet in breadth, and 22 feet 6 inches in height, presenting a sectional area of 850 feet, and exceeding 60 times the area of the drift which had been attempted as before alluded to. For a more comprehensive illustration of the magnitude of the excavation made for the Tunnel under the Thames, it may not be improper to mention, that it is larger than the interior of the old House of Commons, which, being 32 feet in breadth by 25 feet in height, was only 800 feet in sectional area; and it may further be observed, that the base of this excavation, in the deepest part of the river, is 75 feet below high water.

It is by means of a powerful apparatus, which has been designated a "*shield*," (a view of which is given in one of the plates,) that this extensive excavation has been effected, and that the double arcade, which now extends to nearly the middle of the river, has at the same time been constructed within it. This shield consists of 12 great frames, lying close to each other, like as many volumes on the shelf of a book-case: these frames are 22 feet in height, and about 3 feet in breadth. They are divided into three stages or stories, thus presenting 36 chambers, or cells for the operators to work in—namely, the miners, by whom the ground is cut down aud secured in front; and the bricklayers, by whom the structure is simultaneously formed from the back of these cells.

Powerful and efficient as this apparatus has proved to be in accomplishing so considerable a part of the work as that which has been done, the influence of the tide upon some portion of the strata that constitute the bed of the river, is a circumstance which contributed more than any other to increase the labor, and to multiply the difficulties, and also in giving them occasionally an awful character. That influence upon some of the strata, or upon some portions of the strata, has not been noticed by the drift-makers, owing most probably to the circumstance that more than nine-tenths of their excavation had been carried on under a bed of rock.

The shield was placed in its first position at the bottom of the shaft by the 1st of January, 1826, and the structure of the double archway of the Tunnel was commenced under a bed of clay; but on the 25th of the same month the substantial protection of clay was discovered to break off at once, leaving the shield for upwards of six weeks open to a considerable influx of the land-water, copiously issuing from a bed of sand and gravel fed at each tide: the progress of the work was in consequence much impeded during that time.

On the 11th of March this fault or break in the clay was cleared, and the shield being again under a bed of clay, the work proceeded, and on the 30th of June, 1826, arrived even with the margin of the river, increasiug daily in its progress; and by the 30th of April, 1827, the Tunnel had advanced 400 feet under the bed of the river; these 400 feet of the Tunnel were excavated, and the double archways substantially completed with brickwork in ten months and a half. On the 18th of May, 1827, and again in the month of January, 1828, the river broke in, and filled the Tunnel, thereby occasioning the apprehension that this singular undertaking, which had given such great apprehension, and had caused so much excitement, not merely in England, but in all parts of the Continent, must be abandoned; but, after closing, with strong bags of clay, the holes or chasms in the bed of the river where the irruptions had occurred, upon re-entering the Tunnel the structure was found in a most satisfactory state, and perfectly sound, thus affording the strongest proof of the efficiency of Mr. Brunel's system of constantly protecting as much as possible every part of the soil during the excavation, and finishing the structure in the most solid manner as the work proceeded; it being evident that the work already done must have been abandoned, if any part of it had been carried away by the irruption of the river.

Subsequent to the irruptions of the river before mentioned, such was the desire to see the work completed, that several hundred plans were tendered for filling up the cavity, as well as for

preventing future accidents. When the disadvantages are considered under which these proposals were made, without the projectors of them having possessed any information of the depth and rapidity of the river, of the curvature of its bed, or even of the nature of the soil under which the excavation was to be carried on, it cannot be surprising that the Engineer found among them no effectual remedy, or method of preventing a recurrence of accidents: all the plans, however, were duly examined, and attentively considered; and the Board of Directors expressed, under date of the 16th of December, 1828, their obligations to the many scientific men who had so spontaneously communicated their several ingenious plans for securing the completion of the undertaking.

With regard to the projects which were offered for the continuance of the work, if the authors had previously informed themselves of the several strata of earths through which the excavation was to be made, they would not, as men of experience, have proposed them for adoption. It being as impossible to proceed with the excavation, and the formation of the arches, without constantly and effectually supporting the soil in every direction, as that an engineer could erect the piers of a bridge without preventing by his coffredam the influx of the water: and in this respect no attempt was made to point out a more secure mode of proceeding, or any improvement in that all important shield, which has gradually advanced a distance of six hundred feet, under the constant pressure of a vast mass of soil, ill suited, in point of consistency, to bear the pressure of the water above, varying, but amounting, at ordinary full tides, to that of a perpendicular column of 35 feet.

The works having remained in a state of total inactivity during a period of seven years, have been recommenced under the most favorable auspices; and from the experience gained during the progress of this unprecedented work, the difficulties which have been heretofore overcome, and the measures which will be adopted for preventing future accidents, there is very little probability of any circumstances occurring to hinder the complete success of this important undertaking.

September. 1835.

TYRONE POWER'S IMPRESSIONS OF AMERICA.—RAILROADS.

From this amusing work of a clever ("English and Yankee clever") author, we have extracted the following remarks on the subject of our internal improvement. The writer commences with his opinion of an article in an English review quizzing the Yankees for attempting a railroad.

"I never in my life perused any article more philosophical in spirit or more conclusive in argument; the scheme was clearly shown not only to be absurd but impracticable, and the projectors proved either to be presumptuous imitators, or men profligately speculating upon the ignorant credulity of their fellow-citizens.

"I closed the review, in short, admiring the clear judgment and practical far-sigthedness of the writer; pitying the Yankees, for whom I cherished a sneaking kindness, and inwardly hoping that this very clever exposition of the folly of their seeking to counteract the manifest designs of Providence, which had so clearly demonstrated their paths, might produce as full conviction on their minds as it had on mine.

"Well, I forgot the article and its subject, and was only reminded of it by finding myself one fine day whisking along at the rate of twenty miles an hour, over a well-constructed railway, one of a cargo of four hundred souls. The impossibility had, in fact, been achieved; and, in addition to the natural roads offered by Sea, Lake, and River, I now found railways twining and locomotives hissing like serpents over the whole continent from Maine to Mississippi. Binding the cold North to the ever-flowing streams of Georgia and Alabama, literally with bonds of iron, and forming, indeed, the natural roads of a country, whose soil and climate would set at nought all the ingenuity of M'Adam, backed by the wealth of Crœsus and the flint of Derbyshire to boot.

"Now, had such a result been prognosticated only a few years back, the man whose foresight had led to such a large view of the subject would have been mouthed at as mad all over the American continent, and written down knave or ass, or both, in every practical journal of Europe.

"Such great changes constantly agitated, and reduced to practice with a promptitude of which even England, with her wealth, industry, and enterprise, has little notion, make discrepancies between the facts and opinions of rapidly-succeeding travellers, for which neither the veracity nor the judgment of the parties can fairly be impugned.

"Action here leaves speculation lagging far behind; the improvement once conceived is in operation by such time as the opposing theorist has satisfactorily demonstrated its impracticability; and the dream of to-day is the reality of to-morrow.

"I feel, in fact, a difficulty in describing without seeming hyperbole, the impressions I daily received, and beheld confirmed by facts, of the extraordinary spirit of movement that appears to impel men and things in this country; this great hive wherein there be no drones; this field in which every man finds place for his plough, and where each hand seems actually employed either 'to hold or drive.'

"For ever wandering about as I was, and visiting, as I frequently did, the same places at intervals again and again, I had occasion to be much struck with a state of things of which I was thus afforded constant evidence; take for instance:

"My first journey in Sept. 1833, between New-York and Philadelphia, was by steamboat and railway, having cars drawn by horses over thirty-five miles, which thus occupied five and a half hours. In October of the same year I did the same distance by locomotive in two hours. When first I visited Boston, the journey was performed in twenty-four hours, by steamer to Providence, thence to Boston by stage; the same distance now occupies fifteen hours, a railway having been last spring put in operation between Providence and Boston.

"Again, in 1834, the traveller had but one rough route from Philadelphia to Pittsburg. You can now go a third of the distance by railroad, and, getting into a canal-boat, are dragged over the Alleghany mountains, through a series of locks not to be surpassed for strength or ingenuity of contrivance.

"In 1833, the journey from Augusta, Georgia, to New-York, was an affair of eleven or twelve days; it is now performed in three. Steam and railroad, are in fact, annihilating time and space in this country. In proof of it, I can safely assert that if a traveller visiting the South-West, say from Savannah to New-Orleans, will be at the trouble of recollecting this book in the year 1837, he will find the account of the difficulties of my journey extremely amusing; since, in all human probability, he will perform that in five days, which took me, with hard labor, perseverance, discomfort, not to say some peril of life or limb, just eighteen.

"It is these revolutions, and such as these, that form the true wonders of this country; that stimulate curiosity, excite interest, and well repay the labor of any voyager imbued with a grain of intelligence or observation, to say nothing of philosophy.

"It is to these results, their causes, and their immediate and probable effects, his mind's eye will be irresistibly drawn, not to spitting-boxes, tobacco, two-pronged forks, or other *bagatelle*, the particulars of each of which, as a solecism in polite manners, can be corrected and canvassed by any waiter from the London Tavern, Ludgate-street, and by every *grisette* from American Square to Brompton Terrace, who may choose to display their acquired gentility 'for the nonce.'

"It is the absence of a spirit of philosophy generally in our writers, and this affectation of prating so like waiting-gentlewomen, that stings Americans, and with some show of reason, when they see the great labors of their young country and the efforts of its people passed lightly by, and trifles caught up and commented upon, whose importance they cannot comprehend, and the which they have neither leisure nor example to alter or attend to."

REPORT OF THE SELECT COMMITTEE,

On so much of the Governor's Message, as relates to the construction of a Ship Canal around the Falls of Niagara.

The Select Committee, to whom was referred so much of his Excellency, the Governor's Message, as relates to the construction of a Ship Canal around the Falls of Niagara, would respectfully report:

That the action of the Committee has been deferred till this late period, with the expectation of receiving the survey and report of Captain W. G. Williams, the United States Engineer, who examined the route of the proposed Ship Canal during the last

per to submit such facts as have presented themselves for their consideration.

The practicability of this great national work does not admit of a single doubt; and in whatever light it may be viewed, it is one justly entitled to the favorable consideration of the General Government. Aside from its advantages to the interest of the Union, the interest of the whole western States and Territories, is deeply involved in its accomplishment. This Canal would open a ship and steamboat communication between the immense regions surrounding the western Lakes and those bordering on the Ontario and St. Lawrence, and perhaps at no distant day with the city of New York.

The commercial advantages to be derived from a communication between Lake Ontario and the chain of western lakes, have in a great measure been secured to the British Government by the construction of the Welland Canal. The enterprising spirit of that Government is not to be satisfied with this connecting link between our inland seas, but is evinced by recent demonstrations of an intention to engage in a still more extensive system of internal improvement.

The following applications to the Provincial Parliament of Upper Canada, during the present winter, will exhibit the strong feeling which exists on the subject.

"For a company to construct a Rail Road from Toronto to the waters of Lake Huron."

"For a Rail Road from the Detroit river to the town of Niagara."

"For a Rail Road from Wellington Square, (at the head of Lake Ontario,) to Goodrich, on Lake Huron."

"For a company with power to make a lateral cut to connect the Welland Canal and Niagara river at its mouth."

"For a company to construct a Canal from Grand river to the river Thames, thence to the town of London."

"For a company for the purpose of opening a Ship Navigation, through the neck of the Peninsula, between the Lake and the Bay of Toronto."

"For a charter to construct a Ship Navigation from Lake Erie to some point in the Niagara river below Fort Erie Rapids."

The attention of your committee has been more particularly drawn to the consideration of the last mentioned plan of improvement. It is intended to lessen, in a great degree, the distance by Canal, communicating between Lake Ontario and Lake Erie. A Ship Canal on the American side, would possess very great advantages in this respect over the nearest possible route on the Canadian shore, and particularly over the Welland Canal, which is forty-one miles in length. From the report of N. S. Roberts, Esq. an Engineer, who made a survey of the route on the American side in 1826, it appears the whole length of the Canal, by way of the village of Manchester, is nine miles and seventy-three chains, and by way of Gill Creek and Bloody run eight miles. It is understood that Captain W. G. Williams, the United States Engineer, will recommend the shortest route. Upon either of the foregoing routes no locks are necessary from the commencement of the Ship Canal, on the Niagara river, two and a half miles above the Falls, to Fort Gray, near the village of Lewiston. "Here the locks commence, and in a distance of one mile and sixty-seven chains, are located 32 locks of 10 feet lift each, making the total lockage at this place 320 feet, from 8 feet below the level of the water at its commencement, to the same distance below the water at its proposed termination, in the harbor of Lewiston." Stone of the best quality, for the construction of permanent locks, will be obtained from the cutting in the immediate vicinity, and it may be observed that no section of the country is better supplied with all the requisite materials for the successful completion of such a work.

The total expense for the construction of this Canal, as estimated by Mr. Roberts, is $930,826. The dimensions of the Canal were calculated for 36 feet width at the bottom, 60 feet at the water line, and 8 feet deep. The proposed dimensions of the locks were 25 feet wide in the chamber, and 120 between the gates.

Your committee regret that they have not yet been able to obtain the recent survey and estimates made by Mr. Williams, as they are decidedly of the opinion that he has recommended the construction of a Canal and locks of sufficient capacity to admit the largest vessels to pass that navigate the lakes. This appears to be demanded, not only by the rapid increase of population, wealth and commerce in the west, but by the extraordinary exertions of the British Government to secure an uninterrupted communication between the western lakes and the ocean, by improving the navigation of the St. Lawrence.

More than a million and a half of dollars have been appropriated for the construction of a navigable channel around the rapids of the St. Lawrence, and the work is now in progress. When the obstructions in that river shall be overcome, steamboats and vessels navigating the ocean will pass into Lake Ontario, and those drawing eight feet water into Lake Erie. The contemplated improvements around the rapids of the St. Lawrence river are to be on a scale sufficiently large to admit the passage of ships of 300 tons burthen. The locks are to be 200 feet in length, 55 in width, with nine feet of water. These important improvements will probably be completed in the course of two or three years, and they will give to the Canadas a decided superiority over the United States, in securing the immense commerce of the west. But another consideration of deep interest is involved in the construction of a Ship Canal around the rapids of the St. Lawrence, and that is, the advantages which this communication, between the Ocean and Lake Ontario, would give to the British Government if the two nations should again assume a belligerent attitude. The improvements contemplated and in progress, are on a most magnificent scale. They are designed to open a safe and uninterrupted ship navigation from the Atlantic to the upper lakes. It is already ascertained that the dimensions of the Welland Canal are too limited to admit vessels of such capacity, as it is proposed to pass around the rapids of the St. Lawrence. For the purpose of increasing the capacity of this Canal a negotiation is now pending between the Provincial Government of Upper Canada and the Welland Canal Company, for the purchase of the Canal. Should this negotiation be successful, it is easy to foresee that the Welland Canal would be so enlarged as to admit the passage of vessels of 300 tons burthen. In that event, who would monopolize the trade and commerce of the west? What flag would be seen floating at Buffalo, Cleveland, Detroit, and Chicago? It would not be the star spangled banner! This must be apparent from the inequality that now exists between the British and American commerce on the Ontario and St. Lawrence. In 1833 more than thirty British steamboats were in constant and profitable employment on these waters, while the Americans had only *three*.

Your committee deem it unnecessary to enter minutely into an examination of the great commercial advantages to be derived from the construction of a Ship Canal around the Falls of Niagara. The importance of connecting the chain of western Lakes, with the Ontario and St. Lawrence, are too obvious to require argument. The experience of the last ten or fifteen years, has demonstrated the superiority of natural water communication, over that of Canals. It is found that Lake and River transportation is from from two to three hundred per cent cheaper than by canals at the present low rates of tolls. Wheat can be carried from Troy to New York for three cents per bushel, while the cost or transportation, the same distance on the canal, would not be less than nine or ten cents. The same inequality in the cost of transportation, will be found to exist upon all the lakes and rivers that admit of ship or steamboat navigation.

Your committee are fully aware that this improvement, aside from the commercial advantages it will confer on the western States and Territories, is a work of a national character, and one in which the interest of the Union is deeply involved.

A period may arrive, when a free navigable communication between the Lakes, by means of a Ship Canal on the American side of the Falls of Niagara, will be essentially important, if not indispensable to the national defence. In the event of a war with Great Britain, such a channel of communication would be necessary to the protection of our extended frontier along the Lakes and the St. Lawrence. When the works now in progress, in Upper and Lower Canada, shall be completed, vessels will pass from the Atlantic to the Lakes, thereby rendering it impossible to make any successful defence against an enemy possessed of every means of increasing its strength to any desirable extent. The committee, therefore, believing this work one of great national importance, recommend for adoption the following resolutions:

Resolved, by the General Assemby of the State of Ohio, That the construction of a Ship Canal around the Falls of Niagara, should be regarded as a NATIONAL WORK, giving security to our commercial intercourse with foreign powers, and necessary as an effectual means of national defence.

Resolved, That the interest of Ohio, as a member of the Union, is deeply involved in the construction of a navigable communication between Lake Erie and Lake Ontario, summer. That report, though daily expected, has not yet been received; and your committee have therefore thought pro-

and that his Excellency, the Governor, be authorized to transmit to the Ohio delegation in Congress, copies of the foregoing report and resolution, recommending their co-operation in obtaining an appropriation for the construction of a Ship Canal around the Falls of Niagara.

(From the Columbia Telescope.)

LOUISVILLE, CINCINNATI, AND CHARLESTON RAILROAD.

The Act incorporating a company for the construction of a Railroad from Charleston to Cincinnati and Louisville on the Ohio River, having become a law in the States of North and South Carolina, Tennessee, and Kentucky, the Commissioners appointed by the Legislature of this State to cause the necessary surveys to be made, met in Columbia on Friday last, the 25th inst. The following named gentlemen compose this commission, all of whom were present:—Gen. Hayne, Chairman; Colonel Blanding, Gen. Thos. F. Jones, Hon. P. Noble, Dr. Thos. Smith, Charles Edmonston, Esq.

The Board adjourned on Saturday, after making all the preliminary arrangements for entering immediately upon the necessary explorations and surveys.

Col. James Gadsden was unanimously appointed Chief Engineer; and with the assistance of the following officers, (who have been ordered on this duty by the Secretary of War,) it is expected will enter immediately upon the exploration of all the passes through the mountains, viz:

Capt. Williams, Lieut. Dayton, Lieut. White, of the U. S. Army, and* Mr. Feathstonehaugh, a Civil Engineer in the service of the government—all of them advantageously known to the public.

In addition to these officers, it is understood that efforts will be made by the Board to obtain the services of Col. Bisbane, now in command of a Regiment in Florida, and Capt. Huger and Lieut. Colcock, of the army—officers whose zeal and abilities eminently qualify them for the work.

It is expected that these officers will be able to make such progress in the surveys, as to enable the Commissioners to lay before the Convention, to be assembled at Knoxville, on the 4th of July next, satisfactory information as to the difficulties to be encountered in the several mountain ranges which traverse the proposed route, as well as the means of surmounting them. It is expected, that in surveying the route through the State of Tennessee, Assistant Engineers may be furnished by the Board of Internal Improvements of that State, the Legislature of which has, we understand, pledged the State to the amount of *seven hundred and fifty thousand dollars*, for the construction of the Road. In Kentucky, also, it is expected that the Commissioners will be aided in making the surveys, as a proposition for a liberal appropriation for that object, was before the Kentucky Legislature, when last heard from. It was also proposed in that body to appropriate *one million dollars* towards the work, with, as we are informed, a fair prospect of success.

Gen Hayne, as Chairman of the Board, and as agent of the State, under the appointment of the Governor, will, we are informed, have the general superintendence of the operations during the recess of the Board, and for that purpose, will consult and arrange with the Engineers the course of proceeding.

In the appointment of Col. Gadsden to the important office of Chief Engineer, there is every reason to believe that a gentleman has been selected whose distinguished talents and high character will command public confidence in an eminent degree. This gentleman, (who is well known throughout the Western States,) is a native of South Carolina, and a grandson of the venerable Gen. Gadsden, of revolutionary memory. He was for many years an officer in the corps of U. S. Engineers. He was present in that capacity during the New Orleans campaign, and served also as an *Aid de Camp* to Gen. Jackson. He was greatly distinguished for his gallantry and military talents, as well as his skill as an Engineer, and was honorably mentioned in the official reports of his commander. So highly was his talents and character estimated by the Government, that on the resignation of Gen. Bernard, he was appointed to succeed him as Chief Engineer and head of the Bureau in Washington, charged with the superintendence of all the scientific surveys made under the orders of the War Department; which station he filled until the new organization, by which that office was abolished. Col. Gadsden was also at the head of the Board employed by the Charleston and Columbia Committees in November and December last, to explore the passages through the Allegany and Cumberland mountains; on which subject he made, in conjunction with his colleagues, (Col. Brisbane and Mr. Holmes,) a report which, we understand, gives ample testimony of his scientific attainments, sound judgment, and practical knowledge. The valuable information which it affords will be of great service in making the surveys now to be commenced. On the whole, it is believed that a gentleman better qualified for the office could not have been obtained in the United States, and we trust that his valuable services may be secured to his native State.

The other gentlemen named, (with the exception of the Civil Engineer,) are also, we are informed, natives of South Carolina, and are all young officers of high promise, who, we are sure, will enter upon their task with a zeal worthy of the great work in which they are to be engaged. It may well be a subject of honorable ambition for any man to connect his name with this noble enterprise. With Mr. Featherstonebaugh we have no personal acquaintance, but if he be the gentleman of that name who has been so long before the public, he is much and deservedly distinguished for his scientific attainments. As an eminent mineralogist, our mountains will afford him a fine field for his researches.*

We understand that after making all the necessary arrangements for the prosecution of the work, the Commissioners adjourned, to assemble again at Flat Rock, on the 20th of June next, with a view there to meet their Engineers, and prepare with them a report, to be laid before the Knoxville Convention, on the 4th of July.

Prior to the adjournment of the Board, Col. Blanding laid before them a mass of valuable information on the subject of the proposed Railroad, especially in connection with the resources of the extensive region with which it will open communication—which was deemed by the Board of such importance, as to induce them to request that he would prepare a report on those subjects, to be published for general information. This document will not only be valuable for its statistical information, but will also embrace a satisfactory explanation of the various amendments which were made to the Charter by the Legislature of Kentucky, most of which, in the opinion of Col. B. will tend to promote the progress of the work, and extend its usefulness.

We annex hereto an address to the people of this State, inviting them to appoint Delegates to represent them at the Knoxville Convention, to which we would earnestly call public attention.

ADDRESS.

The undersigned, in obedience to the direction of the Commissioners, would invite the attention of his fellow-citizens to the subject of the Railroad Convention, which is to be held at Knoxville, in the State of Tennessee, on the 4th of July next.

The object of that Convention is to bring together, by their Delegates, the people of all the States directly interested in the proposed Railroad, which is to extend from Charleston to the Ohio River. It is very desirable that South Carolina should be fully and ably represented in that Convention. No State can have a deeper interest in the proposed road. It is now certain that Ohio, Tennessee, Kentucky, North Carolina, and Georgia, will send to that Convention many of their ablest men, deeply interested in the success of the work; and it is expected the measures to be there adopted, will exert a controlling influence upon the undertaking. In order that these measures should be conceived in wisdom, and be guided by a spirit of conciliation and harmony—it is of the last importance, that ample information should be spread before the Convention, in relation to the resources and character of the whole country through which the proposed road may pass. With these views the citizens of South Carolina are earnestly requested to assemble in their respective judicial districts, and appoint Delegates to the Knoxville Convention. The magnitude and importance of the proposed work, not only to our own State, but to our whole country, will suggest to every patriotic citizen the high duty of suffering no feelings of local interests or sectional jealousies, to find a place in the measures to be adopted, in relation to this noble enterprise. Let Delegates be selected from among those best informed on the subject of the productions, the cost of labor and materials, and other facilities for the construction of the proposed road, and let them carry with them ample information on all these points, charged only by those they represent, to use their best efforts to promote the grand object, the success of which will be an enduring monument of the wisdom and patriotism of our people.

ROBERT Y. HAYNE, Ch'n, &c.

Columbia, S. C. March 28, 1836.

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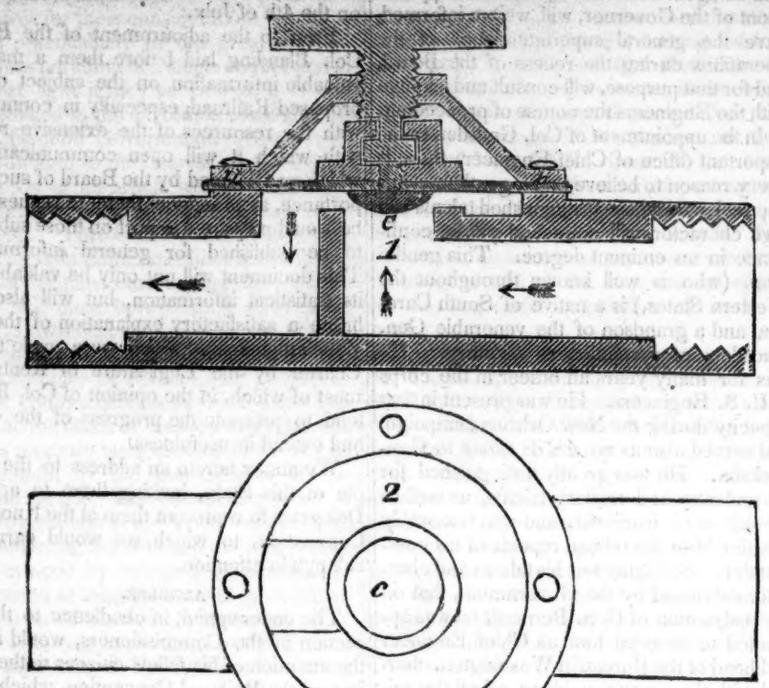
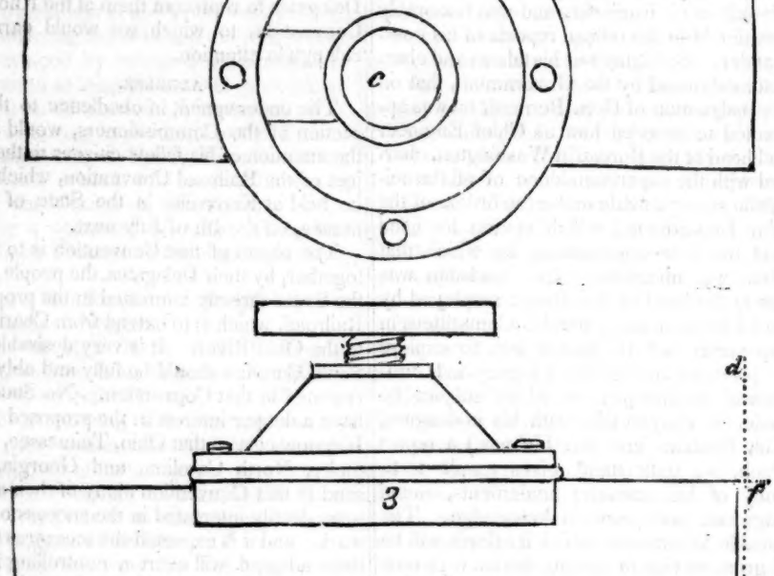
* Lieut. Reid has since been added.

* This is the amended title adopted by the Legislature of Kentucky.





CARTER'S PATENT VALVE FOR REGULATING THE FLOW OF GAS AND OTHER FLUIDS.

The apparatus hitherto in use for regulating the flow of gas has been formed upon the principle of the ordinary liquor-cock, and that, even for its original purposes, is but an imperfect instrument.—Mr. Carter, in constructing his new apparatus, has altogether discarded the cock-plug and substituted a valve, by which all the parts subject to friction are kept separate and totally excluded from the action of the gas. The plug and socket of the ordinary cock are acted upon chemically by carburetted hydrogen gas, be the instrument ever so well constructed and of the very best metal; and to shield them from corrosion, and prevent their becoming in consequence immoveable, they must be frequently lubricated with oil or some other unctuous matter. Now it must be evident, that where oil can be admitted as a lubrication there must be a way for the escape of gas, in consequence of its very volatile properties; hence the frequent annoyance to consumers by escapes of gas, and the losses to proprietors by the waste from innumerable leaks, which, though trifling upon a single service or street burner, amount upon the aggregate to a very serious sum.

Mr. Carter, by a simple and novel arrangement, has succeeded in keeping all the parts of his apparatus which are subject to friction entirely separate from the gas; and in wholly confining the gas to the conducting pipe when shut off. The valve by which the flow is regulated can neither stick fast nor leak; and any escape of gas is rendered impossible.

We anticipate from the introduction of this improved valve a great increase in the consumption of gas; for there need be no longer any danger of explosion from the accumulation of the inflammable fluid in cellars, or of annoyance from its escaping into the apartments of dwelling-houses where gas-lights may be used.

Description of the Engravings.

Fig. 1. A longitudinal section on the vertical line *d e*, fig. 3.

Fig. 2. Section on the horizontal line *f* fig. 3.

Fig. 3. Geometrical elevation of the apparatus complete.

The figures are of the full size, and represent the half-inch service-valve.

At *a*, fig. 1, is a cap, secured firmly by screws, which serves the purpose of fastening and protecting the pliable substance *b*. When the gas is to be admitted this pliable substance is raised by the screw through the centre of the cap; and when it is desired to shut it off, it is pressed upon the aperture *c*.

In fig. 1 this pliable substance may be described as a neutral point, neither raised nor depressed, although partially open; but when raised by means of the screw as much above the level as it requires to be depressed for the purpose of shutting off the gas, the column of fluid on passing through the aperture (*c*) expands into a column of more than eight times the capacity of the service; consequently, the small elevation of the valve requisite to prevent any undue strain upon the pliable substance *b*, is more than sufficient to carry as much fluid as the diameter of the pipe can convey.

The apparatus, when placed in the position of figs. 1 and 3, with a fall towards the main on the one side, and a fall towards the meter on the other, can never be choked by condensation; and if placed in the position of fig. 2, or vertically, it must be evident that no inconvenience can ever accrue from any accumulation of condensed matter.

The valve may be made of any dimensions, so as to suit equally the smallest burners and the largest service-pipes.

In applying this valve to water-works, Mr. Carter proposes to make the cap cylindrical which covers and secures the pliable substance, so that the disc may be extended to the full dimensions of the enlarged column; the extended disc will afford a protecting resistance against the pressure of the enlarged column of water upon the pliable intervening substance.

URE'S PHILOSOPHY OF MANUFACTURES.—The following is the preface to a late interesting work by Dr. ANDREW URE, upon the manufacturing operations of Great Britain.

We give the preface, with a view of calling attention to the work, from which we shall make copious extracts hereafter.

The present is distinguished from every preceding age by an universal ardor of enterprise in arts and manufactures. Nations convinced at length that war is always a losing game, have converted their swords and muskets into factory implements, and now contend with each other in the bloodless but still formidable strife of trade. They no longer send troops to fight on distant fields, but fabrics to drive before them those of their old adversaries in arms, and to take possession of a foreign mart. To impair the resources of a rival at home, by underselling his wares abroad, is the

new belligerent system, in pursuance of which every nerve and sinew of the people are put upon the strain.

Great Britain may certainly continue to uphold her envied supremacy, sustained by her coal, iron, capital, and skill, if, acting on the Baconian axiom, "knowledge is power," she shall diligently promote moral and professional culture among all ranks of her productive population. Were the principles of the manufactures exactly analyzed, and expounded in a simple manner, they would diffuse a steady light to conduct the masters, managers, and operatives, in the straight paths of improvement, and prevent them from pursuing such dangerous phantoms as flit along in the monthly patent-lists. Each department of our useful arts stands in need of a guide-book to facilitate its study, to indicate its imperfections, and to suggest the most probable means of correcting them. It is known that the manufactures of France have derived great advantage from the illustrated system of instruction published under the auspices of its government and patriotic societies.

The present volume, introductory to a series of works in more ample detail, is submitted to the public as a specimen of the manner in which the author conceives technological subjects should be discussed. Having been employed in a public seminary for a quarter of a century, in expounding to practical men, as well as to youth, the applications of mechanical and chemical science to the arts, he felt it his duty, on being solicited from time to time by his pupils, now spread over the kingdom as proprietors and managers of factories, to prepare for publication a systematic account of their principles and processes. With this view he resolved to make afresh such a survey of some of the great manufacturing establishments, to which he had liberal access, as might qualify him to discharge the task in a creditable manner. This tour of verification would have been executed at a much earlier date, so as to have enabled him, ere now, to have redeemed his pledges both publicly and privately given, but for an interruption of unexpected magnitude.

The Right Honorable the Lords of the Committee of the Privy Council for Trade and Plantations requested him, about three years ago, to undertake a series of experiments on the refining of sugar, in order to ascertain the relation of the drawbacks on exportation of refined loaves to the duties paid upon the raw article. Under an impression that these researches might be set sufficiently in train, in the space of two or three months, to lead to the desired information in the hands of experienced operatives, he undertook their arrangement; but encountered so many difficulties from the delicacy of the material operated upon, and other circumstances stated in his official report printed by order of the House of Commons, that he did not get entirely extricated from them till nearly two years were expired, nor till he had suffered considerably from anxiety of mind and bodily fatigue. Being advised by his medical friends to try the effects of travelling, with light intellectual exercise, he left London in the latter end of last summer, and spent several months in wandering through the factory districts of Lancashire, Cheshire, Derbyshire, &c., with the happiest results to his health; having everywhere experienced the utmost kindness and liberality from the mill-proprietors. Neither they nor the great mechanical engineers who construct their buildings and machinery, use any mystery or reserve towards a visitor actuated by legitimate feelings and principles; but, on the contrary, most readily show and explain the curiously-productive inventions which surround them.

The few individuals who betray jealousy of intelligent inspection are usually vain persons, who, having purloined a few hints from ingenious neighbors, work upon them in secret, shut out every stranger from their mill, get consequently insulated and excluded in return, and thus, receiving no external illumination, become progressively adumbrated; till, after a few years of exclusive operation, they find themselves undersold in the market, and deprived of their oldest or best customers by the inferiority of their goods. Were it not invidious, the author could point out several examples of clever people having thus outmanœuvred themselves, in trying to steal a march upon their friends in the dark. Mystifiers of this stamp are guilty of the the silly blunder of estimating their own intrinsic resources above those of all the world beside. It is, however, not more for the advantage of the kingdom, than for that of every individual manufacturer in it, to receive light from all quarters, and to cause it by reflection to irradiate the sphere around him.

In tracing the progression of the British system of industry, according to which every process peculiarly nice, and therefore liable to injury from the ignorance and waywardness of workmen, is withdrawn from handicraft control, and placed under the guidance of self-acting machinery, the author has made it his business to study the descriptions of most of the patents of that nature obtained in Great Britain, France, and America, during the last twenty years,—a task in which he has been assisted by Messrs. Newton and Berry, of Chancery-lane, gentlemen deservedly esteemed for the soundness of the specifications which they professionally prepare for patentees.

To James Cook, Esq., of Mincing-lane, he is indebted for the extensive assortment of samples of raw cotton, wool, flax, and silk, which have formed the principal subjects of his microscopic researches upon textile fibres, as also for much valuable information on the statistics of trade.

Nor ought he to leave unacknowledged the polite readiness of S. M. Phillipps, Esq, Under Secretary of State, and of Mr. Porter, of the Board of Trade, to aid his formation of a census of the factory population, and his inquiries into the commerce of the kingdom.

In delivering this general Treatise on Manufacturing Industry into the hands of the public, the author is not unconscious of defects, both in its matter and arrangement; for most of which, however, an apology may be found, in the vague and contradictory opinions entertained by experienced manufacturers on many departments of their business. Those of his readers who have most deeply considered the difficulties of his undertaking will not be the least indulgent.

The body of facts distributed throughout the volume have been most carefully verified, and will, it is presumed, bear the strictest scrutiny, though a desire to keep the volume at such a price as would bring its purchase within the reach of working-men has precluded the multiplication of notes of reference to authorities. The main portion of these, indeed, would have been to the reports of Parliamentary Committees; many great folios of which have been diligently consulted in quest of authentic information—though sometimes to little purpose. In consequence of the judgments of even honest men being strangely perverted by passion, prejudice, and self-interest.

The engravings at pages 48, 49, 120, 162, 271, 273, afford specimens of the original drawings of machines made under the author's eye, for illustrating modern manufactures; the complete series of which, when published in his forthcoming works on the cotton trade, dyeing, calico-printing, &c., will, it is hoped, constitute an interesting gallery of practical science.

London, June 18th, 1835.

From the Annals of Education for April.

FUNDAMENTAL PRINCIPLES OF THE PRUSSIAN SCHOOL SYSTEM.

We have rencently conversed with several officers of the Prussian government in reference to their system of education. To enter fully into this system and to understand completely any portion of it, it must be remembered that in this kingdom, the State, the church, and the school, are inseparably united by numerous and intimate bonds. The government is at the head of the church and the school—if we may be allowed to use the latter term in the same general sense as the other, to include all the schools of the kingdom. It assumes the right to prescribe that every village must have its church and its school, that every man shall have the means of religious instruction—that every child shall attend some school. It does this on the ground that its citizens should be prepared to become good subjects, and that they cannot be so without receiving both intellectual and religious instruction. Its right is undisputed to preserve the bodies of its subjects from injury, and to have them trained to military exercises, and military skill, that they may be prepared to serve and defend their country by physical power, and prevented from becoming burdens for want of it. It claims the same right to guard their minds from debasement and corruption—to require, that they should receive that instruction which will aid them in gaining a subsistence, and being useful to their country; and that moral training, which will make them good subjects.

It does not seem to enter into the conception of any officer of State, or church, or school here, that order can be secured

in a community without religion, or that morality can have any other sold basis than *Christian instruction and Christian training, in a Christian spirit.* In reference to mere secular instruction, the state prescribes the subjects and directs the modes of teaching through a number of instructors, and a body of inspectors appointed for this purpose, and appointed simply for their qualifications in this respect without any of those distracting questions and jealousies about party or sect which would embarrass our governments. But in regard to religion, it assumes only the right to decide, and to insist, that *instruction shall be given;* leaving to the clergy of each church the entire direction of the subjects and the manner of instruction.

The laws, however, decide one point absolutely, that religious instruction must take the first place in importance, and from a part of the business of this school daily, for not less than one hour in six. It will not permit that it should be confined to the weekly catechetical instruction of the clergy, which is given with a regularity and minuteness unknown to our clergy in general, and still less to the irregular and uncertain instruction of parents, so many of whom cannot if they will, or will not if they can, attend properly to this part of their children's education.

In the application of these principles the laws appear to secure every important point. Provision is first made for the preparation of Christian school masters, of the leading denomination, by the establishment of distinct seminaries for teachers, sustained by government, but regulated and inspected by the clergy of the respective churches. Where the parents in a school district are agreed in reilgious opinions, a teacher of the same sect gives religious instruction, under the direction of the pastor, and everything goes on with regularity and in harmony.

In places where each of two or more denominations is sufficiently numerous to *sustain* a school, the Government, although connected of itself with the reformed, or as it is now termed the evangelical church, consisting of the old Lutherans and Reformed united, establishes and sustains schools for each. The Catholic Seminaries supply teachers for the Catholic schools, and even the Jewish children are furnished with an instructor of their own sect.

The most perplexing case is that in which the inhabitants of a small village or district are so divided that no single sect is sufficiently numerous to sustain a school. Here the laws direct that a " simultaneous school" shall be established; that is,—one in which children of *all sects* are united for the purpose of mere intellectual instruction. Still, the Government here insists, that religious instruction shall be given in connection with the school. Pastors are accordingly required to give instruction to the children of their respective flocks, during the week, and are subject to the supervision of the Inspector of Schools, in regard to the faithful performance of this duty; whilst no interference is allowed as to the opinions taught. There is so little jealousy between *good* men, even of different denominations, that the teacher of such schools is sometimes of one sect, sometimes of another.

It is in this manner that the Prussian system of education establishes certain fixed points of support, which leave room for universal and indefinite improvement, and which brings every institution of society in harmony with the rest. It secures permanent superintendents devoted to these objects, previously well-qualified, and gaining every year stores of experience for themselves, and the minister of education, by their regular tones of inspection and examination, and aided by the more detailed reports of local inspectors. It is in this manner they furnish every child in the land with a complete and harmonious course of instruction of the best kind, and *confer no power* on a subject, without endeavoring to instil the principles and form the habits of thinking and feeling which shall direct him in *using it aright.*

The nature of the Government also enables them to execute a law,—which however reasonable, might meet with resistance elsewhere,—to secure by civil regulation the attendance of every child on the instruction thus provided.

It would seem at first sight difficult to apply such a system to countries differently situated. It is certain indeed, that where the direction rests with the mass of the people, light must be more extensively diffused, and education better understood, and more highly appreciated, before such measures can be executed, or even adopted. It is not less true, however, that if we admit the fundamental principles, that the State has as much right to claim the mental, as the bodily services of its citizens, and to require suitable preparations for it, and that religious instruction is indispensable, as the basis of moral principle, and of a spirit of obedience to the laws, and of genuine liberty, the plans adopted to carry them into effect, are the most simple and excellent which could be devised.

Frankfort on Mayne, Nov. 27, 1835.

THE POOR BOY.—We delight to trace the progress of genius, talent, and industry, in humble life. We dwell with pleasing emotion on the character and conduct of individuals who, from a 'low estate' of obscurity and poverty, have raised themselves by their own native energy, to affluence and stations of respectability and renown. Our country is full of examples of this description. They fall under our observation every day. Gideon Lee was once a poor boy, and in the occupation of a farmer. He is now in affluent circumstances—recently Mayor of New-York, and at present a member of Congress.—Charles Wells, late Mayor of Boston, was a journeyman mason. Samuel T. Armstrong, the acting Governor of Massachusetts, and at the head of several philanthropic institutions, was once a journeyman printer. There are those living, who recollect George Tibbets, a day laborer, and know him now as a gentleman of wealth, influence, and enterprise—the Mayor of the city of Troy, Stephen Warren, the well known and esteemed President of the Troy Bank, rich in this world's goods, and rich too, in public spirit and deeds of benevolence, came from an obscure town in Connecticut, pennyless—a shoemaker. Perseverance, energy and industry, and moral worth, produced this consummation of human wishes. With one more example we will close our sketch.

Thirteen years since, a poor boy, 'hired himself' to the captain of one of the steamboats on Lake Champlain, in some humble occupation. Few know the temptations to which young men are liable in the mixed, irregular company of a steamboat —surrounded by evil company, and under equally bad influences. But the poor boy had a talisman to keep him from falling.—He recollected that there was one human being who relied on and cared for him.—'He was the only son of his mother, and she was a widow.' He faithfully discharged his humble duties. His conduct was marked by those who passed that way, and by his employers. Aspiring for what he merited, he gradually reached the top of his profession. He commanded one of the first steamboats on the Lake. His uniform politeness and attention to those who were necessarily thrown in his way, commanded for him universal respect and esteem.—His reputation reached the ears of the greatest steamboat associations in the world; and many who knew him when a boy on the Lake, now see him at the head of the most splendid boat that foams and dashes through the waters of the noble north, and from a salary of $5 per month, his pay increased to $1500 per annum.

Thirteen years have not altered the good principles of his youth; he still retains that simplicity and purity of character which must ever be regarded as the true nobility of human nature.—[N. Y. Messenger.]

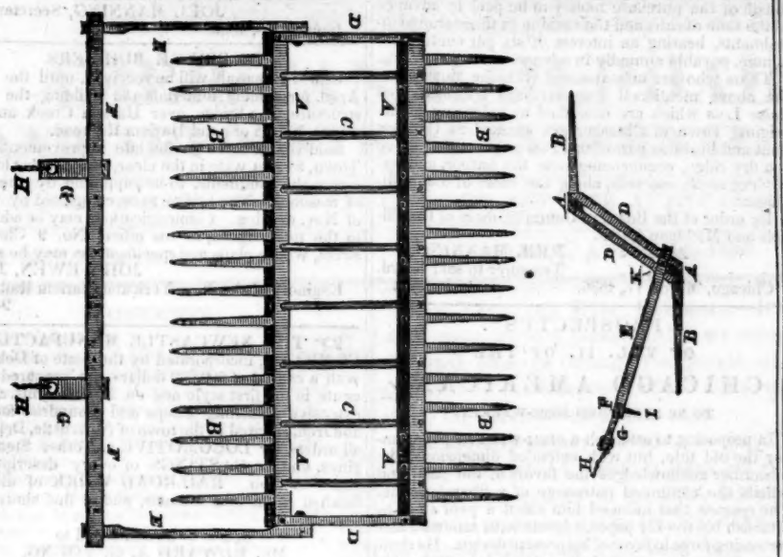
SUGAR FROM INDIAN CORN.—M. Pallas lately presented to the Academie des Sciences of Paris a sample of this substance, extracted from the stem of the plant, which has been found to contain nearly 6 per cent. of sirop boiled to 40 degrees, a part of which will not crystalize before fructification; but it condenses and acquires more consistency from that period to the state of complete maturity. The most favorable time to obtain the greatest quantity of sugar, is immediately after the maturity and gathering of the fruit. The matter left after the extraction of the sugar, is capital to feed cattle or to make packing paper.—[London Mechanics' Magazine.]

RAILWAY TRANSIT.—It would require 12 stage coaches, carrying fifteen passengers each, and 1200 horses to take 180 passengers 240 miles in twenty-four hours, at the rate of 10 miles an hour. One locomotive steam engine will take that number, and go two trips in the same time, consequently will do the work of 2400 horses! Again, it would require thirty mail coaches (six passengers each,) and 3000 horses, to take 180 passengers and mail, 240 miles in twenty-four hours, at the rate of 10 miles an hour. One locomotive steam engine will take that number, and go two trips in the same time, consequently, will do the work of 6000 horses!—[T. M. Hackney.]

PUDNEY'S PATENT REVOLVING HORSE RAKE.

From the deep interest we feel in every thing which tends to facilitate the labor of the agriculturist, especially in the important branches of haying and harvesting, we presume our readers will be pleased with the following notice of an article, which has been well recommended to us from sources entitled to the fullest credit, and whose good opinions were the results of experience.

This machine is so simple and plain in its construction, as scarcely to need any other description than the following engraving.—We give the diameter for its proportion in the inventor's own words, and we also copy his advertisement on the cover of the Cultivator.



References.

A, A, heads. B, B, teeth. C, C, connecting rods. D, D, end bars. E, E, end shafts. F, F, cross-bar. G, G, short shafts. H, H, trace chains. I, short teeth in the under side of the cross-bar. K, slide pin.

Directions for making.

The heads may be from 7 to 10 feet long, and 2½ by 3 inches diameter. In the edges, or narrowest sides of the heads, the teeth may be inserted into holes 1 inch in diameter, and about 6 inches apart. The teeth, including the tenon, may be 2 feet long, and an inch and a half in diameter at the shoulder; the other end being made sharp or pointed. The connecting rods may be about 2 feet 4 inches long, including the tenons, and an inch and a quarter in diameter. They may be either round or square. The end bars may be square, and an inch and a quarter diameter, and as long as the connecting rods. The holes in the head, into which the connecting rods are inserted, must be bored in an oblique or slanting direction, as shown by the end bars in the end view; the connecting rods, the end bars, and the tenons on the ends of the heads, all slanting in the same direction. The end bars are fastened to the heads by means of a bolt or rivet, which passes through them, as well as through the tenon on the ends of the heads. These tenons may be an inch in thickness. The cross-bar may be 3 or 3½ inches wide in the middle, and narrower at the ends. It may be — inches thick.—The end shafts may be 4 feet long, 2½ inches thick, and shaped as shown in the engraving. The short teeth may be 3½ inches long from the shoulder to the point, and inserted into holes three-fourths of an inch diameter, and one foot apart, in the under side of the cross-bar. The shoulder on the short teeth may be on the back side of them, and the holes into which they are inserted need not be bored more than half way through the cross-bar. The short shafts can bear about the proportion to the rest of the rake shown in the engraving. The size and proportions of the different parts can be varied to suit the work to be performed. If the ground to be raked is rough and uneven, a short rake will work much better than a long one. But if the meadow to be raked is smooth and level, and the owner wishes to rake fast, a rake 10, or even 12 feet long, can be used. For raking grain, on smooth ground, the rake may be made long enough to rake two swaths at once—the horse going between them.

REMOVAL.—The Office of the Railroad Journal, New-York Farmer, and Mechanics' Magazine, is removed to 132 *Nassau street*, opposite Clinton Hall, and two doors *below Beekman street*.

☞ Will those Editors to whom the Journal is sent, do me the favor to notice this removal, send their papers in exchange, and request the friends of the Periodicals in the country to direct their orders to me at 132 Nassau street.

The favor shall be reciprocated at any and all times, by

D. K. Minor.

March 23, 1836.

To Engineers and Railroad Companies.—The Proprietor of the Railroad Journal proposes to act as Agent for Engineers, and Railroad Companies, in the purchase, or procuring of *Instruments, Books, Account Books, Stationery, &c.*

In the selection of *Instruments* the aid and advice of practical Engineers will always be had. In the furnishing of Blank Books for the Company's use, they will be made to *order*, or to correspond with those in use in this city, if no special order is given, and of the best materials and workmanship. Articles of Stationery of the best quality will be furnished at fair prices—and cash or city acceptances expected on forwarding the articles.

Immediate attention will be given to orders received and the articles furnished at the earliest possible period.

D. K. Minor.

New-York, April 16, 1836.

EDITORS and PUBLISHERS of Newspapers are respectfully requested to take notice and bear in mind that I propose to act as Agent to procure and forward promptly, *Printing Machines, Printing Presses, Types* and *Fixtures* of every description, necessary to furnish a Printing Office complete.

Also to purchase and forward *Paper, Ink*, and other materials used in the line.

Also to collect accounts due in the City and State of Yew-Nork and in the State of *New-Jersey, Pensylvania*, and *all* the *New-England States*.

My heavy losses by the late conflagration render it necessary that I should redouble my diligence and exertion; and it has occurred to me that an Agency of this kind, conducted by an experienced and careful man, will be of much service to gentlemen at a distanee who cannot conveniently visit the city to make the selections themselves. I therefore offer my services in *this line*, or to give any other orders in relation to other matters which may be desired by my friends out of the city.

My long acquaintance with the business, and with the manufacturers of the articles alluded to, and with the collection of *accounts* for Newspapers and Periodicals, will, I trust, enable me to execute orders entrusted to me, to the entire satisfaction of those who may feel disposed to patronize me in this new branch of business.

My commissions will in all cases be reasonable.

☞ No orders will be given for materials unless the payments, or paper offered, is satisfactory to the manufacturer.

D. K. Minor.

TO CONTRACTORS.

Sealed proposals for the graduation, bridging and superstructure of the JACKSON and BRANDON RAILROAD: for the erection of a BRIDGE over Pearl river, and the remaining incidental work necessary to the completion of said road, will be received at the Railroad Office in Jackson, until the 10th of May next.

Plans and specifications will be exhibited at the office, and the necessary explanations given, by the Assistant Engineer upon the line, one week previous to the letting.

It is expected that testimonials of characters, &c. will accompany the propositions of those who are not personally known to the Agent, and the Company reserve the right of rejecting any bids not deemed to their advantage.

W. PETRIE, Chief Eng. & Agent.
J. & B. R. R. & B. Co.
Jackson, Mi. March 15, 1836. 12—3t.

GEORGIA RAILROAD & BANKING COMPANY.

NOTICE TO CONTRACTORS.

SEALED Proposals will be received at this office, between the 1st and 3d of June next, for laying the superstructure on 50 miles of the Georgia Railroad—all materials to be furnished by the Company.

The first ten miles to be commenced by the 10th of September, and completed by the 15th January next—the remainder of the line MUST BE finished on or before the 1st of May, 1837.

Plans and Specifications of the work, may be seen, and all other information obtained on application at the office, one week previous to the letting.

J. EDGAR THOMSON, Chief Eng'r.
Engineer's Office, Augusta, Geo. }
April, 2d, 1836. } 12—4t.

ALBANY EAGLE AIR FURNACE AND MACHINE SHOP.

WILLIAM V. MANY manufactures to order, IRON CASTINGS for Gearing Mills and Factories of every description.

ALSO—Steam Engines and Railroad castings of every description.

The collection of Patterns for Machinery, is not equalled in the United States. 9-1y

NOTICE TO CONTRACTORS FOR EXCAVATION AND EMBANKMENT.

Proposals will be received at the Office of the Munroe Railroad Company, Macon, Geo., between the 19th and 21st of May next, for Excavating and Embanking the whole of the Railroad from Macon to Forsyth, a distance of 25 miles, embracing much heavy graduation.

For further information, apply to
DANIEL GRIFFIN,
Resident Engineer.
J. EDGAR THOMSON,
C. Engineer.
Macon, March 28th, 1836. 11—5t

PATENT RAILROAD, SHIP AND BOAT SPIKES.

☞ The Troy Iron and Nail Factory keeps constantly for sale a very extensive assortment of Wrought Spikes and Nails, from 3 to 10 inches, manufactured by the subscriber's Patent Machinery, which after five years successful operation, and now almost universal use in the United States, (as well as England, where the subscriber obtained a patent,) are found superior to any ever offered in market.

Railroad Companies may be supplied with Spikes having countersink heads suitable to the holes in iron rails, to any amount and on short notice. Almost all the Railroads now in progress in the United States are fastened with Spikes made at the above named factory—for which purpose they are found invaluable, as their adhesion is more than double any common spikes made by the hammer.

☞ All orders directed to the Agent, Troy, N. Y., will be punctually attended to.

HENRY BURDEN, Agent.

Troy, N. Y., July, 1831.

☞ Spikes are kept for sale, at factory prices, by I. & J. Townsend, Albany, and the principal Iron Merchants in Albany and Troy; J. I. Brower, 222 Water street, New-York; A. M. Jones, Philadelphia; T. Janviers, Baltimore; Degrand & Smith, Boston.

P. S.—Railroad Companies would do well to forward their orders as early as practicable, as the subscriber is desirous of extending the manufacturing so as to keep pace with the daily increasing demand for his Spikes.

1J23am H. BURDEN.

RAILROAD CAR WHEELS AND BOXES, AND OTHER RAILROAD CASTINGS.

☞ Also, AXLES furnished and fitted to wheels complete at the Jefferson Cotton and Wool Machine Factory and Foundry, Paterson, N. J. All orders addressed to the subscribers at Paterson, or 60 Wall street, New-York, will be promptly attended to.

Also, CAR SPRINGS.

Also, Flange Tires, turned complete.

J8 ROGERS, KETCHUM, & GROSVENOR.

CHICAGO LOTS.

Notice is hereby given, that on the 20th day of June next, at the Town of Chicago, in the State of Illinois, the following described PROPERTY will be sold at Public Auction, to wit:

All the unsold Town Lots in the original Town of Chicago; and also the Town Lots on fractional Section Number Fifteen, in the Township Number Thirty-Nine, North of Range Fourteen, East of the third principal Meridian, adjoining the said Town of Chicago. The sale will commence on the said 20th day of June, and will be continued from day to day, until all the Property has been offered for sale or disposed of. This property is held by the State of Illinois for canal purposes, and is offered for sale in conformity to the provision of a Statute Law of the said State, authorizing such a sale. The terms of sale are one fourth of the purchase money to be paid in advance at the time of sale, and the residue in three annual instalments, bearing an interest of six per centum per annum, payable annually in advance.

Those who are unacquainted with the situation of the above mentioned Property, are informed that those Lots which are described as belonging to the original Town of Chicago, are situated in the best built and business part of the Town. Section Fifteen is a dry ridge, commencing near the harbor, and extending south, one mile, along the shore of Lake Michigan.

By order of the Board of Commissioners of the Illinois and Michigan Canal.

Attest, JOEL MANNING,
Treasurer to said Board.
Chicago, March 17, 1836. 13-8t

PROSPECTUS

OF VOL. II. OF THE

CHICAGO AMERICAN,

TO BE PUBLISHED SEMI-WEEKLY.

In proposing to establish a SEMI-WEEKLY paper under the old title, but with extended dimensions, the subscriber acknowledges the favors of the past, and solicits the continued patronage of a liberal public. The reasons that induced him about a year since to establish his weekly paper, operate with renewed and increasing force in favor of his present design. He shall endeavor, as it was originally intended, to make his paper American in all things; and by identifying itself with the interests and circumstances of Chicago—which from a recent wilderness has advanced to a population of thirty-five hundred—and of the rich, extensive, and rapidly developing country of which it is the emporium. he hopes it may "grow with their growth, and strengthen with their strength."

As a record of passing events, current literature, of the march of agriculture, commerce and manufactures, and especially of the progress of internal improvements, of which this State, by her recent passage of the act for the construction of the "Illinois and Michigan Canal," has commenced her great and auspicious system, it will aim, as ever, to be accurately and early informed, and thus endeavor to consult alike the tastes and wants of the community with which it is identified. With party, as generally understood, it will have as little to do as possible. Its politics will be the Constitution—its party, the Country.

With this brief explanation of his future course, and his thanks for the more than expected encouragement he has already received, the subscriber again ventures to solicit the continued patronage and extended support of all who may feel an interest in the principles here set forth.

It will be enlarged and otherwise greatly improved, and printed on superior paper, and forwarded to distant subscribers by the earliest mails, enveloped in a strong wrapper.

TERMS.—The AMERICAN will be published SEMI-WEEKLY, at $4 per annum, if paid at the time of subscribing; $5 if paid at the expiration of six months, or $6 if payment is delayed to the end of the year.

*** Any person procuring five subscribers and remitting the pay in advance, will be entitled to a sixth copy gratis, or a deduction of TEN PER CENT.

Persons at a distance remitting a $5 bill will receive the paper fifteen months.

*** All sums to the amount of $10 and upwards may be sent through the Post Office, at my expense.

THOS. O. DAVIS.

Chicago, March 25, 1836.

*** Subscriptions and advertisements for the CHICAGO AMERICAN will be received at the Office of the Railroad Journal, No. 132 Nassau street, by

D. K. MINOR.

STEPHENSON,

Builder of a superior style of Passenger Cars for Railroad.

No. 264 Elizabeth street, near Bleecker street, New-York.

☞ RAILROAD COMPANIES would do well to examine these Cars; a specimen of which may be seen on that part of the New-York and Harlem Railroad now in operation. J25tf

TO CONTRACTORS.

NOTICE is hereby given to all persons who may feel disposed to take Contracts on the Illinois and Michigan Canal, that the Board of Commissioners have determined to commence that work as early in the spring as circumstances will permit. The Engineers will commence their surveys about the 10th of March, and will have several Sections ready for contract by the first of May. It is therefore expected that definite proposals will be received from that date to the first of June. In the mean time the Board invite an early inspection of that part of the route to Chicago, and will afford any information that may be required of them.

All communications will be addressed to "The Board of Commissioners of the Illinois and Michigan Canal, at Chicago."

By order of the Board.
JOEL MANNING, Secretary
January 20, 1836. 8-6t

TO BRIDGE BUILDERS.

Sealed Proposals will be received, until the 15th of April, for finding materials and building the superstructure of a bridge, over Harlem Creek and flats, on the New York and Harlem Railroad.

Said Bridge to be on the late improvement of Mr. Town, 24 feet wide in the clear, and 660 feet long between the abutments, to be supported by three piers of masonry. The bridge to be completed by the 1st of Nov. ensuing. Communications may be addressed to the undersigned, at his office, No. 9 Chambers street, where plans and specifications may be seen.

JOHN EWEN, JR.
Engineer of the New York and Harlem Railroad.
9-t15a

☞ THE NEWCASTLE MANUFACTURING COMPANY, incorporated by the State of Delaware, with a capital of 200,000 dollars, are prepared to execute in the first style and on liberal terms, at their extensive Finishing Shops and Foundries for Brass and Iron, situated in the town of Newcastle, Delaware, all orders for LOCOMOTIVE and other Steam Engines, and for CASTINGS of every description in Brass or Iron. RAILROAD WORK of all kinds finished in the best manner, and at the shortest notice.

Orders to be addressed to
MR. EDWARD A. G. YOUNG,
Superintendent, at Newcastle, Delaware.
feb 20—ytf

AMES' CELEBRATED SHOVELS, SPADES, &c.

300 dozens Ames' superior back-strap Shovels
150 do do do do plain do
150 do do do do cast steel Shovels & Spades
150 do do Gold-mining Shovels
100 do do plated Spades
50 do do socket Shovels and Spades.

Together with Pick Axes, Churn Drills, and Crow Bars (steel pointed), manufactured from Salisbury refined Iron—for sale by the manufacturing agents,

WITHERELL, AMES & CO.
No. 2 Liberty street, New-York.
BACKUS, AMES & CO.
No. 8 State street, Albany.

N. B.—Also furnished to order, Shapes of every description, made from Salisbury refined Iron. 4—ytf

ARCHIMEDES WORKS.

(100 North Moor st. N. Y.)

NEW YORK, February 12th, 1836.

The undersigned begs leave to inform the proprietors of Railroads that they are prepared to furnish all kinds of Machinery for Railroads, Locomotive Engines of any size, Car Wheels, such as are now in successful operation on the Camden and Amboy Railroad, none of which have failed—Castings of all kinds, Wheels, Axles, and Boxes, furnished at shortest notice.

H. R. DUNHAM & CO.
4—ytf

RAILWAY IRON.

95 tons of 1 inch by ½ inch,
200 do. 1¼ do. ½ do.
40 do. 1¼ do. ⅝ do.
300 do. 2 do. ½ do.
300 do. 2½ do. ⅝ do.
soon expected.

FLAT BARS in lengths of 14 to 15 feet, counter sunk holes, ends cut at an angle of 45 degrees, with splicing plates and nails to suit.

250 do. of Edge Rails of 36 lbs. per yard, with the requisite chairs, keys and pins.

rought Iron Rims of 30, 33, and 36 inches diameter for Wheels of Railway Cars, and of 60 inches diameter for Locomotive Wheels.

Axles of 2⅛, 2¼, 2⅞, 3, 3¼, 3½ and 3¾ inches in diameter, for Railway Cars and Locomotives, of patent iron.

The above will be sold free of duty, to State Governments and Incorporated Governments, and the drawback taken in part payment.

A. & G. RALSTON,
9 South Front street, Philadelphia.

Models and samples of all the different kinds of Rails, Chairs, Pins, Wedges, Spikes, and Splicing Plates, in use both in this country and Great Britain, will be exhibited to those disposed to examine them. 4—d7 1mosow